The Welding Engineer

Founded by L. B. Mackenzie, 1916

$3.00 per year in U. S. | Reg. U. S. Pat. Office | $4.00 per year abroad

Vol. 9 | 608 S. Dearborn St. | NOVEMBER, 1924 | Chicago, Ill. | No. 11

HIGH PURITY OXYGEN

OXYGEN buyers should specify the percentage of purity in their contracts, and insist that deliveries are continuously up to specifications.

Airco high purity oxygen can be bought that way —Why buy oxygen any other way? — we prefer to sell it on that basis.

Any Airco representative will inform the buyer how oxygen may be tested and full cylinder contents determined by simple methods.

AIRCO
DAVIS BOURNONVILLE

Air Reduction Sales Company

Home Office: 342 Madison Avenue, New York City

26 Airco Oxygen Plants | 12 Airco Acetylene Plants | 2 Airco Calorene Plants
16 Airco District Offices | 14 Airco Repair Stations | 72 Airco Distributing Points
Airco Apparatus Factories and Laboratories at Jersey City and Elizabethport, N. J.

ANYTHING and EVERYTHING for OXYACETYLENE WELDING and CUTTING

Copyright 1924, Air Reduction Sales Co.

Published monthly by the Welding Engineer Publishing Co. Entered as second class matter Jan. 20, 1916, at the Post Office at Chicago, Ill. Under the Act of March 3, 1879.

Why Eversharp makes leads

Branches which stock Oxweld Equipment and Supplies

EASTERN DEPARTMENT

Boston . . . Massachusetts
Newark . . . New Jersey
Philadelphia . . Pennsylvania
Baltimore . . . . Maryland
Charlotte . . North Carolina
Atlanta . . . . . Georgia
Birmingham . . . Alabama
Pittsburgh . . Pennsylvania
Buffalo . . . . New York

CENTRAL DEPARTMENT

Chicago . . . . . Illinois
Detroit . . . . Michigan
Cleveland . . . . . Ohio
Cincinnati . . . . . Ohio
St. Louis . . . . Missouri
Memphis . . . . Tennessee
New Orleans . . . Louisiana
Houston . . . . . Texas
Tulsa . . . . . Oklahoma
Kansas City . . . Missouri
Omaha . . . . . Nebraska
Minneapolis . . . Minnesota
Denver . . . . . Colorado

WESTERN DEPARTMENT

San Francisco . . California
Seattle . . . . Washington
Portland . . . . . Oregon
Salt Lake City . . . . Utah
Los Angeles . . . California

EVERSHARP makes leads and Waterman makes ink for much the same reason that Oxweld makes welding filler rods.

Eversharp and Waterman make leads and ink to insure the most satisfactory use of their pencils and pens. Oxweld makes filler rods in order to be sure that Oxweld customers will obtain the most satisfactory results from welds made with Oxweld apparatus.

No weld can be stronger than the filler rod with which it is made. The chemical and physical properties of all Oxweld filler rods are known and uniform, and in the Oxweld line you will always find welding rods that are correct for your purpose. When special filler metal is required, Oxweld has extensive laboratory facilities to develop the proper rod.

Oxweld welding rods of uniform quality are stocked at each of the 27 branches listed in the column at the left.

OXWELD ACETYLENE COMPANY

Chicago
3642 Jasper Place

Long Island City, N.Y.
Thompson Ave. & Orton St.

San Francisco
1050 Mission Street

Oxweld

WELDING AND CUTTING APPARATUS

WORLD'S LARGEST MANUFACTURERS OF WELDING AND CUTTING EQUIPMENT

TIRELESS TORCHES

EVEN a small boy can operate a Purox torch without fatigue. That's why these welding torches are called "tireless torches"—they never get tired themselves and they never tire the operator.

There's a very good reason for this Purox virtue—careful, precise, scientific design and construction, resulting in a perfectly balanced tool—balanced as to weight and distribution of metal; balanced as to gas volumes; and balanced as to pressures, so that safety is assured.

These are some of the many reasons why Purox torches give so many years of trouble-free, completely satisfactory service and always produce the much-desired soft, neutral flame which insures a perfect weld.

You'll want to know more about Purox torches. Ask the nearest Purox office for a catalogue and price list today.

PUROX COMPANY

GENERAL OFFICES
BOSTON BUILDING DENVER, COLORADO

3030 Huron St.
Denver, Colo.

362 Pierpont Ave.
Salt Lake City, Utah

2920 First Ave. South
Seattle, Washington

1135 Third St.
Oakland, Calif.

2305 East 52nd St.
Los Angeles, Calif.

1739 Walnut St.
Kansas City Mo.

620 East Hancock St.
Detroit, Mich.

2020 East 22nd St.
Cleveland, Ohio

213 West Ohio St.
N. S., Pittsburgh, Pa.

110 William St.
New York, N. Y.

South Front and Girod Streets
New Orleans, La.

71 Steuart St.
San Francisco, Calif.

Buyers' Index

Readers of The Welding Engineer will find this index to contain the most accurate information obtainable relating to welding apparatus and supplies. The advertising section includes the principal manufacturers of the United States.

ACETYLENE GENERATORS
Air Reduction Sales Co.
American Brass Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Weldit Acetylene Co.

ALUMINUM FILLER RODS
Air Reduction Sales Co.
Allan Mfg. & Welding Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Wm. Cramp & Sons
Davis-Bournonville Co.
Electric Arc Cutting & Welding Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Mach. Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

ALUMINUM FLUX
Air Reduction Sales Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Chemical Treatment Company
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Imperial Brass Co.
Modern Engineering Co.
Morey Flux & Chemical Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

ALUMINUM SOLDER
Air Reduction Sales Co.
Burdett Oxygen Co.
Purox Co.
Welding Metals Mfg. Co.

ANNEALING FURNACES
Buffalo Dental Mfg. Co.
General Electric Co.

APRONS (Asbestos)
Chicago Eye Shield Co.
Electric Arc Cutting & Welding Co.
Ideal Face Shield Co.
Purox Co.

ASBESTOS GLOVES
Air Reduction Sales Co.
Burdett Oxygen Co.
Chicago Eye Shield Co.
Ideal Face Shield Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.

ASBESTOS SHEET PAPER
Air Reduction Sales Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Sall Mountain Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.

ACETYLENE (Compressed in Cylinders)
Air Reduction Sales Co.
Commercial Acetylene Supply Co.
International Oxygen Co.
Prest-O-Lite Co.

BLOW TORCHES (Acetylene)
See "Torches"

BOOKS (Relating to Welding)
The Welding Engineer
Electric Arc Cutting & Welding Co.

Rochester Welding Works

We not only do welding, but supervise the design and installation of oxy-acetylene welding plants; report on welding material and methods; make tests on welding apparatus for efficiency and economy.

Nine years' experience.

Rochester Welding Works
349 Orchard St., Rochester, N.Y

BRASS AND BRONZE FLUX
Air Reduction Sales Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Chemical Treatment Company
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Modern Engineering Co.
United States Welding Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
Weldit Acetylene Co.

BRASS SPELTER WIRE
Air Reduction Sales Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Davis-Bournonville Co.
Oxweld Acetylene Co.
Purox Co.
Torchweld Equipment Co.

BRAZING OUTFITS
Bastian-Blessing Co.
Buffalo Dental Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.

BRONZE FILLER RODS
Air Reduction Sales Co.
American Brass Co.
Bierman-Everett Foundry Co.
Carbic Mfg. Co.
Central Steel & Wire Co.
Wm. Cramp & Sons
Davis-Bournonville Co.
Electric Arc Cutting & Welding Co.
Burdett Oxygen Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.

CABLE (For Leads)
Electric Arc Cutting & Welding Co.
General Electric Co.
Quasi-Arc Weldtrode Co.
Transportation Engineering Corp.
Wilson Welder & Metals Co.

CARBIDE (Calcium)
Air Reduction Sales Co.
Allan Mfg. & Welding Co.
Carbic Mfg. Co.
Gas Tank Recharging Co.
Shawinigan Products Corp.
Union Carbide Sales Co.

CARBIDE (Compressed in Cakes)
Carbic Mfg. Co.

CARBON (Blocks, Paste, Etc.)
Air Reduction Sales Co.
National Carbon Co.
U. S. Welding Co.
Electric Arc Cutting & Welding Co.

CARBON REMOVING TORCHES
See "Torches"

CAST IRON FILLER RODS AND FLUX
Air Reduction Sales Co.
Burdett Oxygen Co.
Bierman-Everett Foundry Co.
Carbic Mfg. Co.
Chemical Treatment Company
Central Steel & Wire Co.
Chicago Steel & Wire Co.
Wm. Cramp & Sons
Davis-Bournonville Co.
Electric Arc Welding & Cutting Co.
International Oxygen Co.
Modern Engineering Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Imperial Brass Mfg. Co.
Page Steel & Wire Co.
John A. Roebling's Sons Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
Transportation Engineering Corp.
United States Welding Co.
Weldit Acetylene Co.

COPPER FLUX
Air Reduction Sales Co.
Bierman-Everett Foundry Co.
Carbic Mfg. Co.
Chemical Treatment Company
Davis-Bournonville Co.
Oxweld Acetylene Co.
Purox Co.
Imperial Brass Mfg. Co.
Weldit Acetylene Co.

CUTTING RODS (Elec. Arc)
Electric Arc Cutting & Welding Co.

CYLINDERS
Wm. Wharton, Jr., & Co.

DRILLS, PORTABLE ELECTRIC
N. E. Strand & Co.
Wodack Electric Tool Corporation

ELECTRIC ARC WELDING OUTFITS
Allan Mfg. & Welding Co.
Electric Arc Welding & Cutting Co.
General Electric Co.
Gibb Instrument Co.
Quasi-Arc Weldrode Co.
Westinghouse Elec. & Mfg. Co.
Wilson Welder & Metals Co.

ELECTRODE HOLDERS
Allan Mfg. & Welding Co.
Electric Arc Welding & Cutting Co.
General Electric Co.
Gibb Instrument Co.
Quasi-Arc Weldtrode Co.
Stoody Co.
Stoody Co.

No. 4

Grade Color "GREEN"
Size: 5/32" Diameter
For Flat, Vertical and Overhead Welding

This wire will produce an extremely hard surface on steel and is not machineable. For use where resistance to wear is an important factor.

Guides, Rock-Crusher Jaws, Frogs, Rail Heads and Switch Points.

No. 6

Grade Color "WHITE"
Sizes: 5/32" Diameter
⅛" Diameter
For Flat, Vertical and Overhead Welding

This wire will produce a weld in steel of about 50,000 to 60,000 lbs. per square inch tensile strength and of medium ductility.

for

Arc Welding

Specify

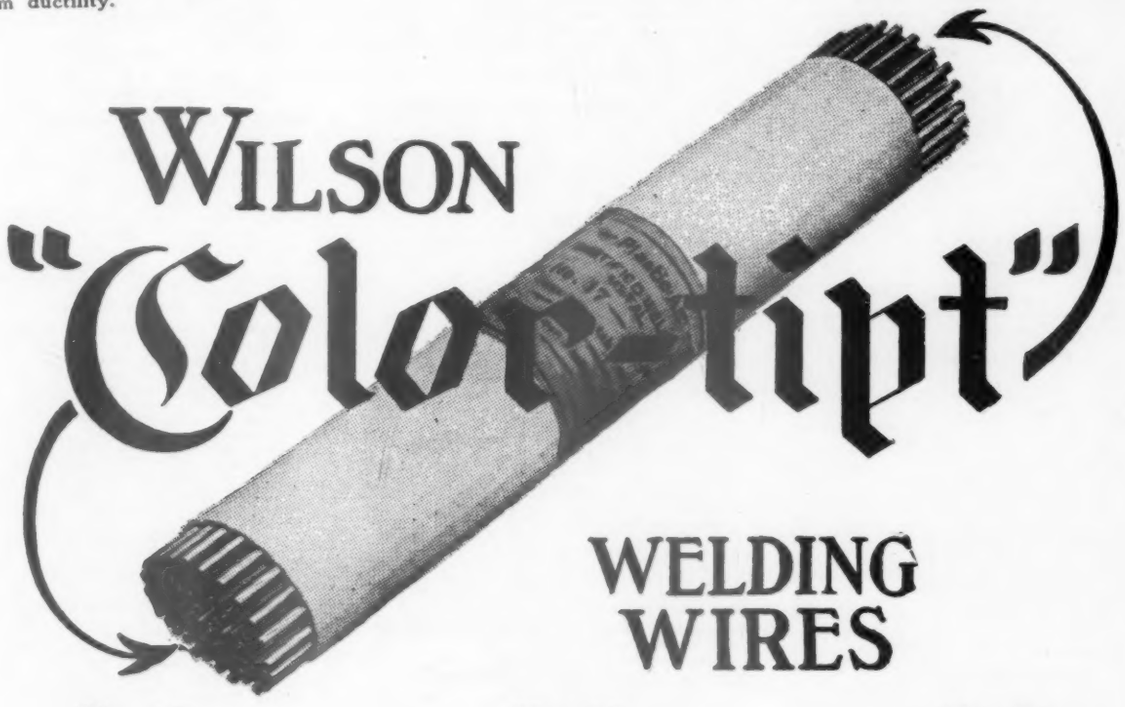
No. 9

Grade Color "BLUE"
Sizes: 3/16" Diameter
5/32" Diameter
⅛" Diameter
For Flat, Vertical and Overhead Welding

This wire will produce a weld in steel of over 60,000 lbs. per square inch tensile strength and an elongation of about 15% in one inch in a mechanically sound weld. Machineable at reduced tool speed.

Automobile Frames, Boiler Plate, Cast Steel Parts, Locomotive Frames, Firebox Seams, Flue Sheet Patches, High Pressure Boiler Work, Oil, Gas and Steam Pipes, Ship Plates, Tanks, Fish Plates, and Rail Bonds.

WILSON "Color-tipt" WELDING WIRES



No. 17

Grade Color "RED"
Sizes: ¼" Diameter
3/16" Diameter
5/32" Diameter
⅛" Diameter
3/32" Diameter
For Flat, Vertical and Overhead Welding

This wire will produce a sound weld in cast iron where studs are used and in steel a weld of about 50,000 to 55,000 lbs. per square inch tensile strength. On steel is easily machineable.

Flue Work, Steel Castings, Blow Holes in Grey Iron Castings.

No. 12

Grade Color "GREY"
Sizes: 5/32" Diameter
⅛" Diameter
3/32" Diameter
For Flat Welding Only

This wire will penetrate cast iron and produce a homogeneous and machineable weld. Readily caulked when cold.

Monel Metal—Wilson Processed

Sizes: 5/32" Diameter
⅛" Diameter
3/32" Diameter

For Welding Monel Metal and Monel to Steel.

No. 20

Grade Color "BROWN"
Sizes: 5/32" Diameter
⅛" Diameter
For Flat Welding Only

This wire will produce a weld in brass, bronze, and light gauge copper.

Pump Castings, Water Wheels, Motor End Rings, Tail Shaft Sleeves, Bearings, and Castings.

No. 50

Grade Color "ALUMINUM"
Size: 5/32" Diameter

For Welding Sheet Aluminum Minimum No. 11 gauge (⅛"), also for Cast Aluminum minimum thickness 3/16".

WILSON WELDER & METALS CO. INC.

HOBOKEN, NEW JERSEY

Transportation Engineering Corp.
Wilson Welder & Metals Co.

ELECTROLYTIC OXYGEN AND HYDROGEN GENERATING EQUIPMENT
Burdett Oxygen Co.
International Oxygen Co.

FILLER RODS (Swedish Iron)
Air Reduction Sales Co.
Alexander Milburn Co.
American Brass Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Central Steel & Wire Co.
Chicago Steel & Wire Co.
Wm. Cramp & Sons
Electric Arc Cutting & Welding Co.
Davis-Bournonville Co.
Modern Engineering Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Page Steel & Wire Co.
Superior Oxy-Acetylene Machine Co.
Transportation Engineering Corp.

FILLER RODS (Tobin Bronze)
Air Reduction Sales Co.
American Brass Co.
Bierman-Everett Foundry Co.
Burdett Oxygen Co.
Central Steel & Wire Co.
Bierman-Everett Foundry Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Page Steel & Wire Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

FILLER RODS (Vanadium Steel)
Air Reduction Sales Co.
Burdett Oxygen Co.
Bierman-Everett Fdy. Co.
Carbic Mfg. Co.
Central Steel & Wire Co.
Universal Oxygen Co.
Wm. Cramp & Sons
Davis-Bournonville Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
Modern Engineering Co.
Purox Co.
Oxweld Acetylene Co.
Reid-Avery Co.
Torchweld Equipment Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.

FIREPROOF PLASTIC
National Carbon Co.
United States Welding Co.

FLUE WELDERS (Electric)
General Electric Co.

FLUXES
Air Reduction Sales Co.
Bierman-Everett Foundry Co.
Carbic Mfg. Co.
Chemical Treatment Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Purox Co.
Weldit Acetylene Co.

FURNACES (Annealing)
Buffalo Dental Mfg. Co.
General Electric Co.

GAS BURNERS (Preheating)
Air Reduction Sales Co.
Davis-Bournonville Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.

GAUGES
U. S. Gauge Co.

GENERATORS (Oxygen or Hydrogen)
Burdett Oxygen Co.
International Oxygen Co.

GLOVES (Welders' Asbestos)
Air Reduction Sales Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Electric Arc Cutting & Welding Co.
Ideal Face Shield Co.
International Oxygen Co.
Imperial Brass Mfg. Co.
Purox Co.
Torchweld Equipment Co.
Weldit Acetylene Co.

GOGGLES
Air Reduction Sales Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Chicago Eye Shield Co.
Ideal Face Shield Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Quasi-Arc Weldtrode Co.
Transportation Engineering Corp.
Weldit Acetylene Co.
Willson Goggles, Inc.

GRINDERS, PORTABLE ELECTRIC
Allan Mfg. & Welding Co.
N. A. Strand Co.
Transportation Engineering Corp.
Wodack Electrical Tool Corporation

HARDENING FURNACES
Buffalo Dental Mfg. Co.
General Electric Co.

HOSE (Oxygen and Acetylene)
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Buffalo Dental Mfg. Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
International Oxygen Co.
Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

HOSE UNIONS
Air Reduction Sales Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
Imperial Brass Mfg. Co.
International Oxygen Co.
K-G Welding & Cutting Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.

HYDROGEN
Burdett Oxygen Co.
Gas Products Association
International Oxygen Co.

HYDROGEN PLANTS
Burdett Oxygen Co.
International Oxygen Co.

KEROSENE PREHEATING TORCHES
Air Reduction Sales Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.

NEEDLE VALVES
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Buffalo Dental Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.

NITROGEN
Air Reduction Sales Co.
Linde Air Products Co.

OIL BURNERS (Preheating)
Air Reduction Sales Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.

OXY-ACETYLENE CUTTING MACHINES
Air Reduction Sales Co.
Davis-Bournonville Co.

OXYGEN (Compressed in Cylinders)
Air Reduction Sales Co.
Burdett Oxygen Co.
Gas Products Ass'n.
International Oxygen Co.
The Linde Air Products Co.
Purox Co.

OXYGEN AND HYDROGEN GENERATING EQUIPMENT
Burdett Oxygen Co.
Gas Products Assn.
International Oxygen Co.

OXYGEN PLANTS (Liquefaction)
M. Keith Dunham

PREHEATING FURNACES
Buffalo Dental Mfg. Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Superior Oxy-Acetylene Machine Co.

PRESSURE GAUGES
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
International Oxygen Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
U. S. Gauge Co.
Torchweld Equipment Co.
United States Welding Co.
Reamers Portable Electric

REGULATING VALVES (Acetylene)
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

REAMERS, PORTABLE ELECTRIC
N. A. Strand & Co.
Wodack Electric Tool Corporation

BUFFERS, PORTABLE ELECTRIC
N. A. Strand & Co.
Wodack Electric Tool Corporation

REGULATING VALVES (Hydrogen)
Bastian-Blessing Co.
Burdett Oxygen Co.
Harris Calorific Co.
International Oxygen Co.
Imperial Brass Mfg. Co.
Modern Engineering Co.
K-G Welding & Cutting Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.

REGULATING VALVES (Oxygen)
Air Reduction Sales Co.
Bastian-Blessing Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Weldit Acetylene Co.

SAND BLAST
Transportation Engineering Corp.

SEAM WELDERS (Electric)
General Electric Co.

TANK CONNECTIONS (Oxygen and Acetylene Adaptors)
Air Reduction Sales Co.
Bastian-Blessing Co.
Davis-Bournonville Co.
International Oxygen Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
The Imperial Brass Mfg. Co.
Torchweld Equipment Co.

TORCHES (Oxy-Acetylene Welding and Cutting)
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Harris Calorific Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Weldit Acetylene Co.

TORCHES (Oxy-Hydrogen Welding and Cutting)
Bastian-Blessing Co.
Burdett Oxygen Co.
Davis-Bournonville Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
nited States Welding Co.

TORCHES (Gasoline and Kerosene Preheating)
Air Reduction Sales Co.
Bastian-Blessing Co.
Buffalo Dental Mfg. Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Hauck Mfg. Co.
International Oxygen Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Westinghouse Electric & Mfg. Co.
Weldit Acetylene Co.
Burdett Oxygen Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
International Oxygen Co.
Modern Engineering Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.

TRUCKS (Cylinder Carriers)
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Modern Engineering Co.
Purox Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.

UNION CARBIDE

WORLD'S BEST QUALITY—HIGHEST GAS YIELD

ALWAYS PACKED IN BLUE AND GRAY DRUMS

Large stocks of Union Carbide in all regular commercial sizes are carried at each of Union Carbide Sales Company's Warehouses listed below.

Requests for information and special correspondence should be addressed to our New York, Chicago or San Francisco offices.

Generator Sizes of Union Carbide
Packed in 100 Pound Drums

3½ in. x 2 in. (Lump)
2 in. x ½ in. (Egg)
1¼ in. x ⅜ in. (Nut)
¼ in. x 1/12 in. (Quarter)

For Oxy-Acetylene Welding and Cutting Plants, Acetylene House Lighting and Cooking Plants, Contractors' Torches and Flare Lights, and numerous other pieces of Acetylene generating apparatus designed for the use of one of these sizes of Carbide.

UNION CARBIDE SALES COMPANY

Peoples Gas Building
Chicago, Ill.

Carbide and Carbon Building
30 East 42nd St.
New York

Balfour Building
California and Sansome Sts.
San Francisco, Calif.

UNION CARBIDE SALES COMPANY'S WAREHOUSES

Shipments Always Made On Day Orders Are Received

ALABAMA
Birmingham....12 S. 20th St.
Mobile....16 S. Commerce St.
Montgomery....3 Jefferson St.

ARIZONA
Phoenix....42 S. Central Ave.

ARKANSAS
Ft. Smith....201 Rogers Ave.
Little Rock....1400 E. 6th St.

CALIFORNIA
Fresno....932 H St.
Los Angeles....639 Gibbon St.
Sacramento....1717 Third St.
San Diego....Seventh and J Sts.
San Francisco...Balfour Bldg., 351 California St.

COLORADO
Denver....Nineteenth and Wazee Sts.

CONNECTICUT
Hartford....409 Windsor St.

DISTRICT OF COLUMBIA
Washington....Maryland Ave. and 9th St., S. W.

FLORIDA
Jacksonville....(P. O. 124) 13 Cedar St.
Tampa....1702 Grand Central Ave.

GEORGIA
Atlanta...Haynes and Rhodes St., P. O. Box 1594
Savannah....P. O. Box 78
Ogeechee Canal, Foot of Margaret St.

ILLINOIS
Chicago....122 S. Michigan Boulevard
Danville....511 Oak St.
Decatur....133 W. William St.
East St. Louis....700 Broadway
Eldorado....856 S. Fourth St.
Harrisburg....631 N. Webster St.
Marion....315 S. Granite St., P. O. Box 747
Monmouth....509 S. First St.
Peoria....100-110 Edmund St.
Quincy....313 Delaware St.
Springfield....1801 Washington St.
Streator....501 E. Hickory St.

INDIANA
Evansville....1401 E. Illinois St.
Fort Wayne....2206 Broadway
Indianapolis....601-637 Kentucky Ave.
Terre Haute....714 N. Fifth St.

IOWA
Davenport....118 Harrison St.
Des Moines....Third and Elm Sts.
Dubuque....8th and Washington Sts.
Fort Dodge....Central Ave. at 16th St.
Ottumwa....207-9-11 S. Washington St.
Sioux City....410 Court St., P. O. Box 398
Waterloo....1209 E. Fourth St.

KANSAS
Pittsburgh....1201 North Broadway
Salina....154 N. Fifth St.
Wichita....600 W. Douglas Ave., P. O. Box 951

KENTUCKY
Allen....
Central City....306 Broad St.
Lexington....Third St. & Walton Ave.
Louisville....Brook and Main Sts.
Middlesboro....1701 Cumberland Ave.

LOUISIANA
New Orleans....118 N. Front St.
Shreveport....615 Market St., P. O. Box 62

MAINE
Portland....48 Commercial St.

MARYLAND
Baltimore....19 E. Lombard St.
Cumberland....P. O. Box 172, 18 N. George St.
Salisbury....406 Main St.

MASSACHUSETTS
Indian Orchard....Pasco Road
Worcester....15 Federal St.

MICHIGAN
Detroit....5785 Hamilton Ave.
Grand Rapids....500 Shawmut Ave., N. W.
Hancock....First National Bank Bldg.
Iron Mountain....513 Stephenson Ave.
Iron River....321 Carnegie Ave., P. O. Box 357
Ironwood....
Ishpeming....412 E. Division St.
Jackson....518 S. Water St.
Lansing....617 E. Shiawassee St.
Muskegon....301 W. Western Ave.
Saginaw....1830-1840 N. Michigan Ave.
Sault Ste. Marie....

MINNESOTA
Minneapolis....334 N. First St.
Virginia....413 Chestnut St.

MISSISSIPPI
Vicksburg....1701-03 Levee St. (P. O. Box 322)

MISSOURI
Kansas City....1422 St. Louis Ave.
St. Joseph....920 S. Sixth St.
St. Louis....(See East St. Louis, Ill.)

NEBRASKA
Omaha....1007-9-11 Jones St.

NEW JERSEY
Camden....Front and Division Sts.
Newark....251-255 Ridgewood Ave.

NEW YORK
Albany....108 Third Ave.
Binghamton....85 Prospect Ave.
Buffalo....1345 Genesee St.
Geneva....261 Exchange St.
Hurleyville....
Jamaica....11 New York Ave.
Kingston....O'Neil St., Near Broadway
Niagara Falls....
Poughkeepsie....Smith St. and C. N. E. R. R.
Utica....135 Hotel St.
Watertown....438 Court St.
Whitehall....Main St.

NORTH CAROLINA
Charlotte....1006 Palmer St., P. O. Box 777
Raleigh...P. O. Box 149, McCullough & Lenoir Sts.
Wilmington....612 Surry St.
Wilson....700 S. Goldsboro St.

NORTH DAKOTA
Fargo....Fifth St. and Second Ave., N.

OHIO
Akron....97 East South St.
Athens....Corner Factory and Moore Sts.
Canton....618 Mulberry Road, S. E.
Cincinnati....67 Plum St.
Cleveland....631 Hanna Bldg. Annex
Columbus....330 Dublin Ave.
Dayton....104-114 S. Wayne Ave.
Gallipolis....700 First Ave.
Lima....338 E. High St.
Mansfield....40 W. Third St.
Steubenville....324-343 N. Seventh St.
Toledo....414 S. Erie St.
Youngstown....Jones and Brittain Sts.
Zanesville....Main and 2nd Sts.

OKLAHOMA
McAlester....127 East Chickasaw St.
Oklahoma....4 West Park Place
Tulsa....1-11 N. Boulder St.

OREGON
Portland....15th and Hoyt Sts.

PENNSYLVANIA
Beaver....244 Buffalo St.
DuBois....Weber Ave. and Franklin St.
Erie....1502 Sassafras St.
Greensburg....Clark and George Sts.
Harrisburg....25 S. Tenth St.
Hazelton....225 East Mine St.
Johnstown....Messenger St. and B. & O. R. R.
Philadelphia....2nd St. and Fisher Ave.
Phillipsburg....P. O. Box 146, North Front St.
Pittsburgh....1202 Chamber of Commerce Bldg.
Pottsville....Railroad and Sanderson St.
Scranton....225 Vine St.
Shamokin....46 West Independence St.
Sharon....Budd St. and South Irvine Ave.
Spangler....Bigler Ave.
Wilkes-Barre....150-156 E. Northampton St.
Williamsport....Canal and Court Sts.

SOUTH CAROLINA
Charleston....3 Liberty St.

SOUTH DAKOTA
Watertown....224 First Ave., N. W.

TENNESSEE
Chattanooga....312 Pound Bldg.
Knoxville....426 West Depot Ave.
Memphis....671 S. Main St.
Nashville....102-104-108 Broadway

TEXAS
Beaumont....386 Liberty St.
Dallas....400 S. Poydras St.
El Paso....First and Kansas Sts., P. O. Box 103
Houston....810-20 Live Oak St.
San Antonio....115 S. Medina St.
Waco....315 S. 13th St.

UTAH
Salt Lake City....108 W. Second South St.

VIRGINIA
Lynchburg....1324 Commerce St.
Norfolk....120 Plume St., P. O. Box 556
Richmond....1709 East Cary St.

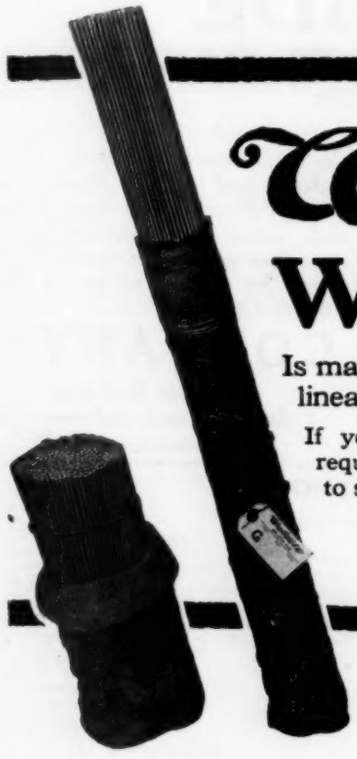
WEST VIRGINIA
Bluefield....195 Roanoke St.
Charleston....Broad St. and K. & M. R. R.
Clarksburg....608 North Third St.
Elkins....Railroad Ave. and First St.
Fairmount....Auburn St.
Huntington....Seventh Ave. and Elm St.
Morgantown....610 University Ave.
Mount Hope....P. O. Box 536
Mullens....P. O. Box 115
Wheeling....43rd and McCulloch Sts.
Williamson....P. O. Drawer L

WASHINGTON
Seattle....304 Railroad Ave., S.
Spokane....162 S. Post St.

WISCONSIN
La Crosse....Front and King Sts., S.
Madison....513-19 Williamson St.
Marshfield....South Depot and Maple Sts.
Milwaukee....120 Jefferson St.

WYOMING
Casper....218-234 Industrial Ave.

UNION CARBIDE IS EASILY OBTAINABLE EVERYWHERE



Weldite
Welding Metal

Is making sounder and tougher welds at a lower cost per lineal foot in thousands of welding shops.

If you have not tried Weldite, it will be worth your while to request samples, which will be gladly furnished free of charge to shop foremen and any others interested in welding.

Furnished Copper Coated for Gas Welding
Bare and Flux Coated for Electric Welding

Manufactured by

CHICAGO STEEL & WIRE CO.
103rd Street & Torrence Avenue, Chicago, Ill.

VALVES (For Oxygen Cylinders)
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Mfg. Co.
International Oxygen Co.

WELDING APPARATUS (Electric)
Allan Mfg. & Welding Co.
Electric Arc Welding & Cutting Co.
General Electric Co.
Quasi-Arc Weldtrode Co.
Westinghouse Elec. Mfg. Co.
Weldit Acetylene Co.
Wilson Welder & Metals Co.

WELDERS' GLOVES
Air Reduction Sales Co.
Carbic Mfg. Co.
Davis-Bournonville Co.
Electric Arc Cutting & Welding Co.
Ideal Face Shield Co.
International Oxygen Co.
Oxweld Acetylene Co.
Purox Co.
The Imperial Brass Mfg. Co.
Transportation Engineering Corp.

WELDERS' GOGGLES
Air Reduction Sales Co.
Bastian-Blessing Co.
Burdett Oxygen Co.
Chicago Eye Shield Co.
Ideal Face Shield Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
International Oxygen Co.
Modern Engineering Co.
Purox Co.
Quasi-Arc Weldtrode Co.
Transportation Engineering Corp.
Weldit Acetylene Co.
Willson Goggles, Inc.

WELDERS MASKS
Allan Mfg. & Welding Co.
Chicago Eye Shield Co.
Electric Arc Welding and Cutting Co.
General Electric Co.
Ideal Face Shield Co.
Torchweld Equipment Co.
Transportation Engineering Corp.
Willson Goggles, Inc.
Wilson Welder & Metals Co.

WELDING RODS AND WIRE
Air Reduction Sales Co.
Allan Mfg. & Welding Co.
Electric Arc Cutting & Welding Co.
Bierman-Everett Fdy. Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
William Cramp & Son
Central Steel & Wire Co.
Chicago Steel & Wire Co.
Cuyahoga Steel & Wire Co.
Davis-Bournonville Co.
General Electric Co.
The Imperial Brass Mfg. Co.
International Oxygen Co.
Managanese Steel Forge Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Page Steel & Wire Co.
Quasi-Arc Weldtrode Co.
Purox Co.
Reid-Avery Co.
John A. Roebling's Sons Co.
Torchweld Equipment Co.
Transportation Engineering Corp.
Weldit Acetylene Co.
Wilson Welder & Metals Co.

WELDING ROD HOLDERS
C. Sorensen
Stoody Co.

WIRE AND CABLE (Asbestos Insulated)
Central Steel & Wire Co.

ALPHABETICAL INDEX TO ADVERTISERS

A
A.r Reduction Sales Co.....Front Cover
The American Brass Co..... 37
Allan Mfg. and Welding Co..... 15
American Welding Society..... 47

B
Bastian-Blessing Co., The.....26-27
Bierman-Everett Fdy. Co..... 48
Buffalo Dental Mfg. Co..... 47
Burdett Mfg. Co..... 11

C
Carbic Mfg. Co.....Inside Back Cover
Central Steel & Wire Co..... 10
Chemical Treatment Co..... 12
Chicago Steel & Wire Co..... 8
Chicago Eye Shield Co..... 50
Commercial Acetylene Supply Co..... 9
Wm. Cramp & Sons 14
Cuyahoga Steel and Wire Co..... 50

D
Davis-Bournonville Co. 50

E
Elec. Arc Welding & Cutting Co..Back Cover

G
Gas Products Assn .....
Gas Tank Recharging Co..... 17
General Electric Co.....33, 35

H
The Harris Calorific Co..... 47

I
Ideal Face Shield Co..... 14
International Oxygen Co..... 50
Imperial Brass Mfg. Co..... 50

K
K-G Welding & Cutting Co..... 15

L
Linde Air Products Co..... 18

M
Manganese Steel Forge Co 49
Modern Engineering Co..... 13
Morey Flux and Chemical Co..... 48

N
National Carbon Co..... 50

O
Oxweld Acetylene Co..... 2

P
Page Steel & Wire Co..... 12
The Prest-O-Lite Co., Inc..... 31
The Purox Co. 3

Q
Quasi-Arc Weldtrode Co..... 50

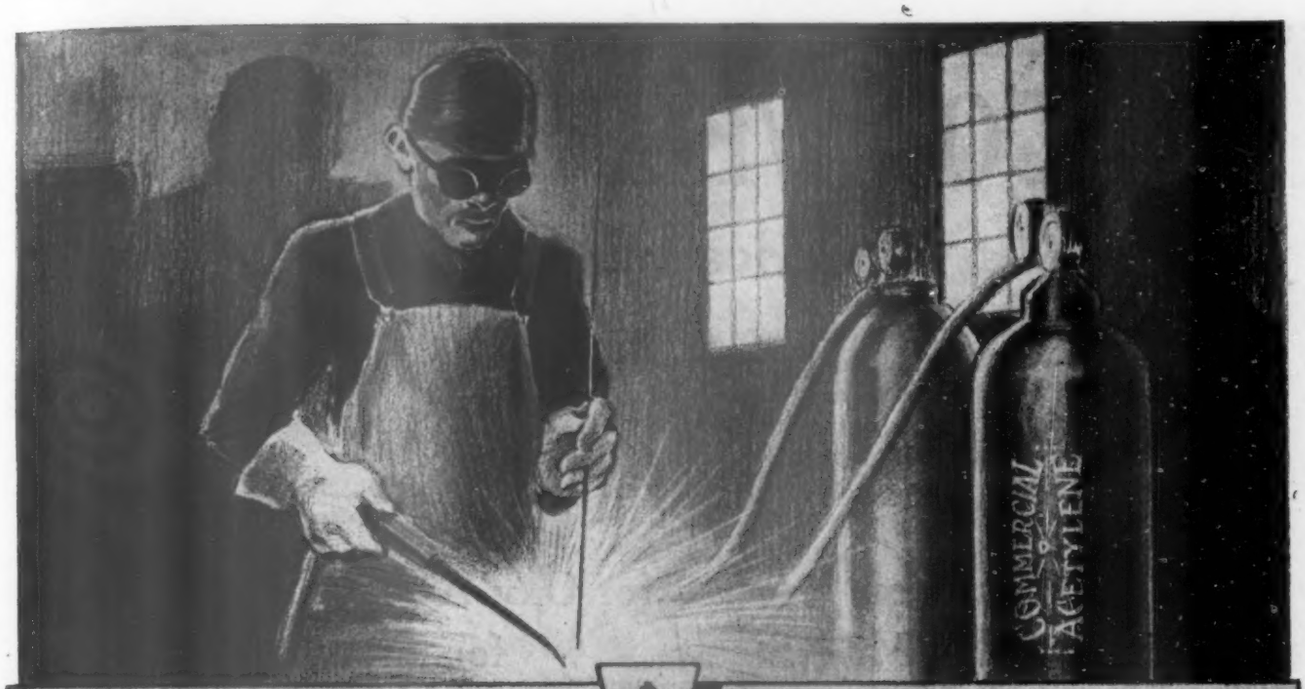
R
Reid-Avery Co..... 10
Rochester Welding Works..... 4
Roebling, John A., Sons Co..... 17

S
C. Sorenson 50
Shawinigan Products Corporation 49
Stoody Co. 50
Superior Oxy-Acetylene Machine Co..... 49
N. A. Strand & Co..... 50

T
Torchweld Equipment Co..... 13
Transportation Engineering Corp..... 47

U
Union Carbide Sales Co..... 7
U. S. Gauge Co.....
United States Welding Co..... 49

W
Weldit Aceptylene Co..... 13
Westinghouse Electric Mfg. Co.....
Wm. Wharton, Jr., & Co., Inc..... 50
Wilson Welder & Metals Co..... 5
Willson Goggles, Inc..... 13
Wodack Electric Tool Corporation..... 48



The right foundation for good cutting and welding is pure Acetylene

We supply it in:

Carload lots, truckloads or single cylinders.

Whatever your acetylene gas requirements may be let us quote you. Outline your gas consumption and our prices will be promptly furnished.

Supplied in the following size cylinders:

10x30in. size	- -	125 cu. ft. capacity
12x36in. size	- -	225 cu. ft. capacity
12x44in. size	- -	275 cu. ft. capacity

COMMERCIAL ACETYLENE

Means pure acetylene.

COMMERCIAL SERVICE

Means prompt service.

No matter what your gas requirements are you will be interested in our sales plan.
Ask our nearest office to tell you about it.

Commercial Acetylene Supply Company, Inc.

General Office: 80 Broadway, New York City

Branches:

80 E. Jackson Blvd.
Chicago, Ill.

421 Trust Co. of Georgia Bldg.
Atlanta, Ga.

683 Atlantic Ave.
Boston, Mass.

550 Monadnock Bldg.
San Francisco, Calif.

"RACO" WELDING WIRES

America's Standard

All "Raco" Welding Wires are guaranteed to meet the American Welding Society specifications in every particular, and in addition are subject to rejection from any cause whatsoever.
The well established policy of THE REID-AVERY CO. to specialize in welding wire only insures absolute satisfaction to our customers. Lowest prices consistent with unvarying quality, prompt attention to orders, unlimited guarantee.

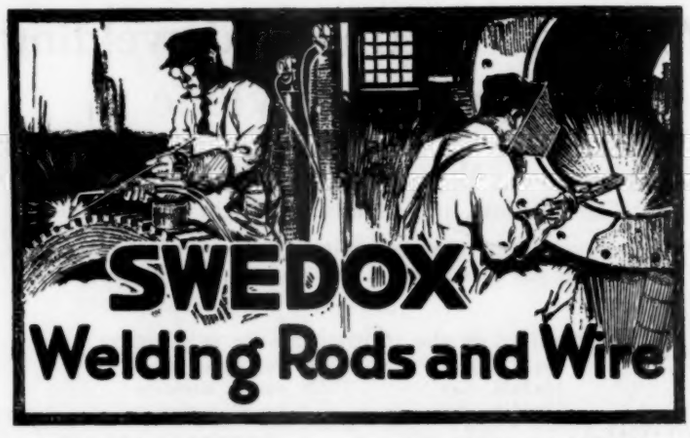
RED LABEL (Iron) - - for Oxy-Acetylene Welding
BLUE LABEL (Mild Steel) - - for Electric Welding
HIGH CARBON, for both Arc and Acetylene Welding

THE REID-AVERY CO., Inc.

21st and Washington Ave., Philadelphia, Pa.

NONOX SWEDOX
LEKTROX SWEDOX
GAS CARBOX
ARC CARBOX

VANOX
NICKOX
KROMOX
RAILOX
CASTOX



SQUARE □ CASTOX
MANGANOX
ALUMINOX

BRONZOX
BRAZOX
TOBIN BRONZE
COPPER ALLOY RODS

COATED ELECTRODES

CASTOX-BRONZOX
ALUMINOX FLUXES.

SWEDOX welding wires and rods can be supplied immediately from stock, conforming in all respects to:

American Welding Society Specifications E No. 1-A; E No. 1-B; E No. 1-C; G No. 1-A; Folios No. 1-E and No. 1-G; and many others. We can furnish a welding wire or rod for any purpose and of any analysis required.

PUT YOUR WELDING TROUBLES UP TO US Let us prescribe the filler best adapted for your requirements. We maintain a research department conducted by experts for the benefit of our customers. This service is FREE OF CHARGE.

FLUXES—CASTOX, BRONZOX and ALUMINOX FLUXES when used with the corresponding non-ferrous filler rod will keep impurities out of the weld and promote thorough fusion.

FREE trial samples of any product will be furnished upon request. A trial of any SWEDOX product will convince you of its superiority. Send for these samples NOW

CHICAGO, ILL.
127 N. Peoria St.

Central Steel & Wire Company

DETROIT, MICH.
Warren & Bellevue Aves.

Safety
Automatic Equal Pressure
Two Gas Regulator

THE development of a Safety Regulator has been a fascinating subject for many years. The growth of the idea has been stimulated intermittently by requests from the Safety Departments of some large users of Oxy-Acetylene Apparatus. To meet what appears to be growing into an insistent demand, the Safety Automatic Equal Pressure Two Gas Regulator has been developed.

Adjustment—With a single adjusting wheel, equal pressures are produced in the oxygen and acetylene hose lines leading from the regulator to the torch.

Safety—Preventing mixed gases in either hose length, by **producing equal pressures automatically,** banishes hose fires, hose explosions, the burning out of regulator seats and the possibility of regulator explosions from flame propagation.

Improved Flame—Insured uniform gas pressures delivered to the torch will produce a more tenacious and well-balanced welding flame.

Time Saving—The single hand wheel controlling both gases in one regulator makes unnecessary numerous adjustments and readjustments by independent regulators on the oxygen and acetylene tanks to obtain two independent pressures or equal pressures before starting operations.

Pressure Readings—With one glance at the center gauge the operator can obtain his torch pressure readings for both gases. The acetylene tank pressure gauge is to the left, the oxygen tank pressure gauge to the right.

Gas Contact—There is no possible chance for the two gases to mix in the regulator. They flow independently until after they pass the valves in the torch and reach the point of mixture either in the handle, or in the head, or in the tips.

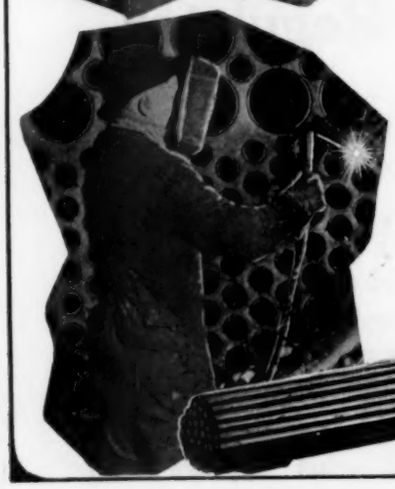
Equal Pressures—The hand wheel, when turned with an upward motion, will bring an equal pressure on the two controlling diaphragms by the compression of a single spring. The thrust of the hand wheel is against ball bearings, hence there is very little force necessary to turn the control.

Unequal Oxygen and Acetylene Tank Pressures—These are controlled by the gas flow areas and resistance. There is always ample volume of both gases for welding operations. It is possible also to use the regulator for cutting when the oxygen pressure required is not greater than 40 pounds. This would make it possible to cut steel billets up to about 3" thickness with a modernized BURCO Cutting or Combination Torch.

Our Complete Catalogue Mailed Upon Request

BURDETT MANUFACTURING CO. 308-320 St. Johns Ct. CHICAGO, ILLINOIS

MAKERS OF EXPERT WELDING APPARATUS



PAGE-ARMCO

GAS WELDING RODS AND ELECTRODES

Page-Armco Gas Welding Rods and Electrodes are a recognized standard. The metal is the purest iron made commercially, and the elimination of gases and slags from the welds is thus assured.

Page-Armco Gas Welding Rods and Electrodes meet all the requirements of the American Welding Society's specifications: G-No. 1-A for Gas Welding Rods; E-No. 1-A for Electrodes.

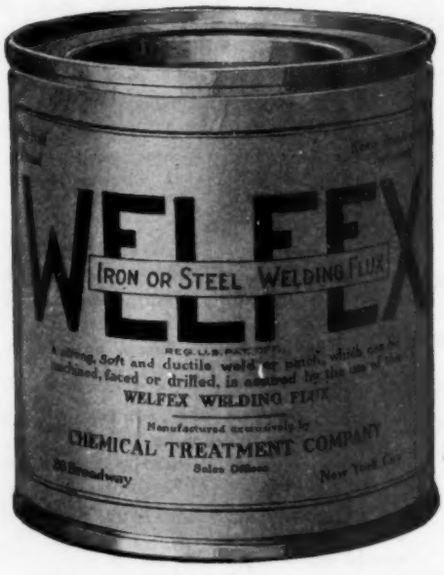
Yellow tag denotes Gas Welding Rods—ends of rods colored yellow. Blue tag denotes Electrodes—ends of rods colored blue.

PAGE STEEL and WIRE CO.
Bridgeport, Connecticut

ARMCO INGOT IRON

An Associate Company of American Chain Co., Inc.
District Sales Offices:
Chicago, New York, Pittsburgh, San Francisco

For Greater Economy and Better Welding Results—



Weld with WELFEX !

WORKING SAMPLE FURNISHED ON REQUEST

Chemical Treatment Company

26 Broadway New York, N. Y.

Selling and distributing agents will be appointed at all supply centers of the United States and Canada. Communications are invited from reputable concerns engaged in the sale and distribution of manufacturing and foundry supplies.

Cut Your Production Cost

At the present cost of acetylene and oxygen, it is very important that the welding torch consume these gases in actual production only. If the welder hangs the torch on a hook while resetting his work or leaving his work for any other reason, the consumption of gases continues at an absolute loss.

By the use of the WELDIT GASAVER, when the operator sets the correct flame at the beginning of the day, if it is necessary to stop welding for any reason, he simply hangs it on the convenient hook and it is automatically shut off. When resuming work, by picking up the torch and passing it over the convenient pilot light, it instantly relights at the same preadjusted flame.

Actual Tests Show a Saving of 25% to 30% On Oxygen and Acetylene

We can state, therefore, that the WELDIT GASAVER is the first real automatic control which can be used on any kind of oxy-acetylene apparatus and will positively reduce the cost of consumption.

Weldit Gasavers have been adopted as standard by:

Fisher Body Corporation, Clayton Lambert Company, Detroit Range Boiler & Steel Barrel Company

Write for descriptive literature

WELDIT ACETYLENE COMPANY

Manufacturers of Approved Welding and Cutting Apparatus

Detroit, Michigan

Grand Rapids - Pittsburgh - Columbus - Cleveland

You Specify Regrinding Valves.

THEN WHY NOT

Meco MULTI-SEAT REGULATOR

MODERN ENGINEERING CO.

Main Office and Factory: 3411-13 Pine Blvd.

ST. LOUIS, MO.

Willson Welding Goggle No. L1.

"Industro" welding glass kills injurious rays and prevents "sandy" eyes. —Furnished only with Willson welding goggles, helmets and hand-shields.

Ask for catalog.

WILLSON GOGGLES, INC.

Reading, Pa.

Cramp's Welding Rods

We also furnish Welding Rods of Cast Iron, Copper Covered Iron and American Iron for welding steel, Vanadium Steel, Nickel Steel, Cast Aluminum, Drawn Aluminum, Soft Brass and Phosphor Bronze, also Steel Electric Welding Rods both flux covered and uncoated.

Parsons' Manganese Bronze

Rolled Welding Rods—The strongest bronze welding rods made for Oxy-Acetylene Welding and High Fire Brazing of Malleable Iron, Brass and Bronze. The use of Parsons' Manganese Bronze Filler Rods in brazing malleable iron results in the strongest possible weld or braze and insures satisfactory work.

Cramp's Cast Iron Solder

for repairing Scored Cylinders and Water Jackets, etc. Thoroughly tried for several years by our customers and found entirely satisfactory.

Cramp's Aluminum Solder

A joint properly made with this solder is stronger than the original casting and is preferable to a welded joint.

CRAMP

We furnish and will be glad to estimate on all kinds of brass and bronze castings.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia

IDEAL Welding Glove

Every welder should use an IDEAL Welding Glove to protect his hands from heat and burns. Made of cape-skin leather, chrome tanned. This extracts all grease and makes it heat resisting and durable.

IDEAL Welding Apron

Every welder should protect himself with an IDEAL Welding Apron. Made from selected, thick but light chrome leather. It has long life and wearing service as the leather so resists heat, tearing and cracking.

SATISFACTION

One thing wanted above all others in the purchase of any commodity is satisfaction. Price is always a secondary consideration. When you buy IDEAL equipment for yourself or for your men—you are buying the best there is. Long service is assured you and maximum protection follows hand in hand. All of our users in welding shops are satisfied that our equipment gives them the most dollar for dollar value that it is possible to get.

PROTECTION

The IDEAL Face Shield protects the arc-welder from direct and reflected rays. It fits snugly, is easily removed or adjusted, and gives the operator free use of his head and arms. It is made of vulcanized fibre and aluminum, is very durable and light. The hinged door allows quick inspection of work and easy interchange of the glasses. An inner glass protects the welder's eyes when glasses are changed. The IDEAL Hand Shield is for the welding foreman or supervisor, it protects his eyes while inspecting the work. It has the same sturdy construction as all IDEAL equipment.

Manufactured and Sold by

THE IDEAL FACE SHIELD COMPANY

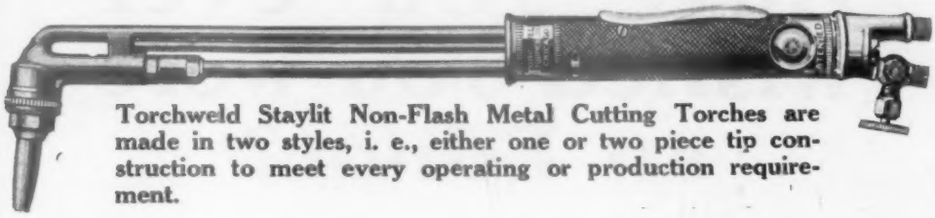
468 N. Garfield Ave., Columbus, Ohio.

You Can Do It Better With TORCHWELD

That Feeling of Complete Satisfaction

experienced by Torchweld Users is easily explained by the quality of Service given by Torchweld Apparatus.

There is, however, one outstanding reason for this condition, and that is that TORCHWELD Products consistently surpass in performance the expectations of their purchasers.



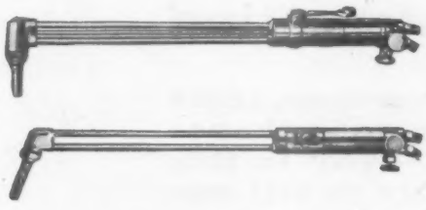
Torchweld Staylit Non-Flash Metal Cutting Torches are made in two styles, i. e., either one or two piece tip construction to meet every operating or production requirement.

The low upkeep and operating expense of Torchweld Equipment together with its certain dependability will increase your output and lower your costs.

Send for Catalog 23-E

TORCHWELD EQUIPMENT COMPANY

224 No. Carpenter St. **Chicago, Ill.**



K-G TORCHES
REGULATORS
COMPLETE UNITS

K-G WELDING AND CUTTING CO., Inc.

Home Office and Factory: 556 W. 34th St., New York City

DISTRIBUTORS & SERVICE STATIONS:—

O. W. Adams & Co., Mamaroneck, N. Y. New England.
Welders Supply Co., 700 McCulloh St., Baltimore, Md.
Charles C. Ebright, 1121 North Ashland Ave., Chicago, Ill.
J. W. Evans & Son, Tompkinsville, Staten Island, N. Y.
Albany Welding & Boiler Works, 40 Madison Ave., Albany, N. Y.
H. Harrison Kress, 1718 Sansom St., Philadelphia, Pa.
Gaul, Derr & Shearer Co., 16th & Fairmont Ave., Philadelphia, Pa.
Welding & Supplies Co., 1142 Ontario St. East, Montreal, Que.
Welding & Supplies Co., Toronto, Can.
Weldit Acetylene Co., 144 W. Larned St., Detroit, Mich.
A. G. Sprague Co., 870 Amboy Ave., Perth Amboy, N. J.
W. C. Swift, West Alexandria, Ohio.
Welders Service Co., Library Rd., Pittsburgh, Pa.
Passaic Bergen Welding Co., 650 Main Ave., Clifton, N. J.
Passaic Bergen Welding Co., 356 Fair St., Paterson, N. J.

Left—200 ampere Allan Welding Transformer

Below—200 ampere Motor-Generator Set

(Also furnished with gas engine or belt drive.)

ALMANC
ARC WELDING
SETS

cover the entire field, consisting of arc welding transformers and generators of various capacities, also welding outfits for use on light cast iron sections such as automotive cylinder blocks and crank cases. Special machines constructed with combination of both arrangements when desired.

Advise us of your welding problems and current supply and we will recommend suitable machines for your requirements.

ALLAN MANUFACTURING & WELDING CO.

724 WASHINGTON ST., BUFFALO, N. Y.

Have you ever wished you were an Editor?

HERE'S your chance! Consider the service and worthwhile things THE WELDING ENGINEER offers its readers each and every month. Consider also, the intense eagerness with which they read the advertising pages. It is equal to that displayed in reading the editorial pages. "Why do this?" you may ask, our answer is simply this—

News is always interesting

This is where you, as an advertiser, come in. This is where you have your chance to be an Editor. "How?"—Why in this way you have an opportunity to tell our readers about your new line of merchandise, your latest equipment, and the recent features incorporated in your standard products.

Don't miss this opportunity—Act—
Use these advertising pages
to put your message across.

Roebling Welding Wire

Conforms to specifications of The American Welding Society.

Roebling copyrighted trade-mark

JR

stamped on each ELECTRODE

Gas Welding Wire
Low Carbon Electrodes
High Carbon Electrodes

Roebling Welding Wire gives satisfactory service and demonstrates its efficiency and reliability. Exacting tests have proven that it possesses those qualities essential to good welding. If you are not using our welding wire, it amply merits your consideration.

Shipped in burlapped bundles

John A. Roebling's Sons Company
Trenton, New Jersey

New York Boston Chicago Philadelphia Pittsburgh Cleveland Atlanta San Francisco Los Angeles Seattle Portland, Ore.

SUN-LITE

BRAND

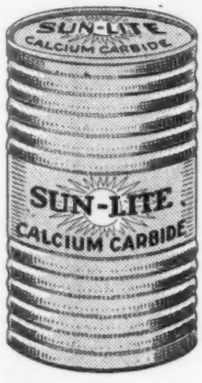
CALCIUM CARBIDE

Is made from best grade of coke and lime. Scientifically treated in an electric furnace so as to produce carbide of excellent quality and large gas yield.

FOR

ACETYLENE GENERATORS
MINERS' LAMPS, FLARE
LAMPS, CONTRACTORS, Etc.

Sizes
3½x2
2x½
1¼x⅜
¼x1/12
MINERS



Packed in non-returnable steel drums containing 100 lbs. net.

Manufactured by

Gas Tank Recharging Co.

Works: Keokuk, Iowa
General Office: - Milwaukee, Wis.

Distributed by

TULSA OXYGEN COMPANY

Tulsa, Oklahoma

SUN-LITE

Why a Vice-President?

THE CONGRESS of the United States wisely established a line of successors to the President. The first in this line is the Vice-President; next the Secretary of State; then the Secretary of the Treasury; and so on. In over one hundred years this reserve has been called upon only a few times, and yet it has given our government a stability not otherwise obtainable.

If you contract with Linde for your oxygen, you probably will always receive your supply from the same plant or the same warehouse. But if anything should happen to this plant or warehouse, or if demand should exceed supply, then Linde has a line of 115 successors—115 plants and warehouses ready to step in and carry the load.

THE LINDE AIR PRODUCTS COMPANY

General Offices: Carbide & Carbon Bldg.
30 East 42d Street, New York

38 PLANTS — 77 WAREHOUSES

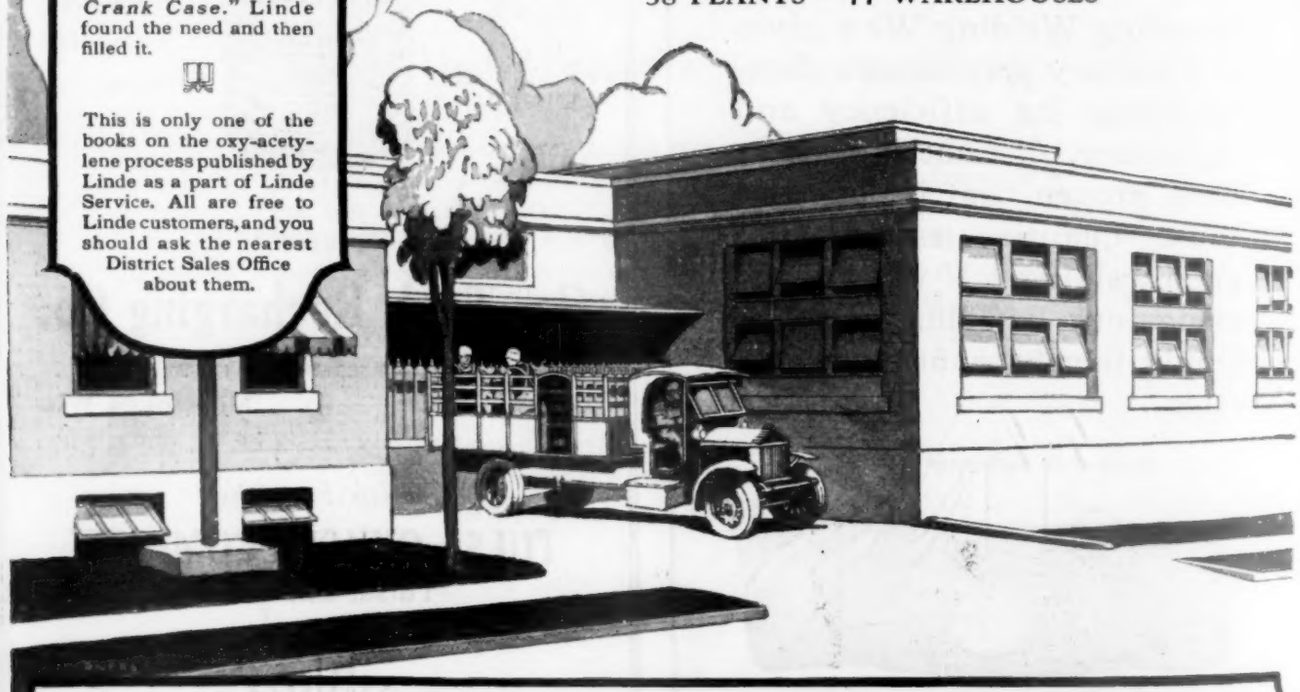
The "Why" of Linde Books

Linde Books are written and published by the Linde Company for one reason only: to supply definite needs of Linde customers.

During the past year one of the representatives of the Linde Company has been calling upon welding shops and wayside garages to discover what the Linde Company could do to help these customers.

As a result of this, Linde has written and published a book called "*Step by Step in Gas Welding a Crank Case.*" Linde found the need and then filled it.

This is only one of the books on the oxy-acetylene process published by Linde as a part of Linde Service. All are free to Linde customers, and you should ask the nearest District Sales Office about them.



LINDE OXYGEN

YOU CAN DEPEND ON THE LINDE COMPANY

Welding Ousts Rivets

Cleveland Meeting of A. W. S. Shows Progress of Welding in Structural Work—Expresses Need for Research

THE Fifth Fall Meeting of the American Welding Society was held at the Hotel Winton, Cleveland, October 30th and 31st, and has been termed the most successful yet staged. The trend and progress of the welding industry was clearly indicated in technical sessions and discussions. Particular attention was given to welding as a structural application, and a very damaging blow at riveted joints was forecast.

The papers which were read at the meeting were "Electric Arc Welding as a Method of Fabricating Large Structures" by H. Goldmark, W. Spraragen and W. L. Warner (read by Mr. Spraragen)—"Uses of Spot Welding in the Structural Field" by H. H. Woofter—"Welding and Cutting in the Structural Field" by G. O. Carter and D. G. McGiehan—"Arc Welded Steel Buildings" by A. W. Turner—"Loosening of Rivets" by R. Kinkaid.

In the paper read by Mr. Spraragen, the various advantages of welding as compared with riveting in building work were outlined. The paper stated that this process would permit a saving in the weight of steel, drawings of a simpler nature, and the elimination of templates and punching holes. It stated that there will be a greater freedom of alinement in making joints, that erection will be easier, and the noise of riveting totally eliminated. It was pointed out that before welding can be universally adopted in structural work engineers must be convinced thoroughly both by buildings already constructed and by laboratory tests. At the present time structural engineers look askance on welds for holding high loads. It must be completely and forcibly demonstrated to them that welded joints are capable of holding such loads. So far, buildings that are welded have been built from designs for riveting, and since there are no reliable figures showing the comparative costs of the two methods, a tremendous amount of research is necessary for progressive welding in this field.

Mr. Warner showed a number of lantern slides illustrating structural steel building in which the joints and trusses were arc welded. Other slides showed a comparison between a riveted railroad bridge truss and the same truss redesigned for welding. He also expressed the opinion that full data was necessary before any decisive statement could be made of saving by this process.

Group Photo of the Members of the American Welding Society Who Attended the Fall Meeting at Cleveland

Mr. H. L. Whittemore, of the Bureau of Standards, expressed the opinion that the welding process is the cheapest and quickest method of steel building construction, but that several metallurgical problems must be worked out. He pointed out the necessity of considerable research in order to gather complete data on fatigue and strength of joints with the view of convincing structural engineers that the tonage of steel used can be reduced by the welding process.

"Ox-Welding and Cutting in the Structural Field," the paper by Mr. Carter, of the Linde Air Products Co., dealt with the extensive use of oxy-acetylene cutting in the building of bridges and pointed out the advantages of the welding process for maintenance and repair work. His paper cited the various instances in which the oxy-acetylene flame enabled engineers to construct first class articles from second hand stock, with only drawings to work from, and at a tremendous saving.

This paper also aimed its broad-side at the riveted joint. The author does not question the strength of a proper oxy-acetylene weld as compared to that of a riveted joint, but rather turns his attention to the use of tubular columns in

construction. Sometime ago, he points out, tubular columns were used with the belief that they were the strongest for their weight. Tubular construction, however, was not extensively used in frame buildings due to the fact that riveting them was difficult. Oxy-acetylene welding, having made possible a stronger joint than the rivet, has rebuilt the popularity of tubular construction. This type of construction has been found very popular during the past four or five years in shops, buildings, warehouses, garages, etc. The author also pointed out that the Army Air Service is now specifying tubular members welded at the joints as standard construction for aircraft fusilages. Mr. Carter's paper also refers to the necessity of research and engineering study.

It was pointed out in this paper that another essential in the wide use of welding in structural work, is the furnishing of competent welders. Mr. Carter states that due to the lack of sufficient numbers of such welders, contractors have been slow to accept welding. However, in the past two or three years, several big welding companies have co-operated on pipe line work, and the principles of organizing a welding gang have been thoroughly developed. He refers in this connection to a 220 mile pipe line which has been welded in Texas.

Mr. Carter's paper also took up the subject of bronze filler rods and the use of a flux for applying bronze to the butting edges of the steel. In the discussion following this paper he said that before the flux with bronze filler is applied, the metal is brought to a red heat, and that the bronze filler lowered the cutting cost by making it possible to do the welding so much faster. He advocated starting with certain parts instead of trying to weld a whole building, and that also test data jobs be provided.

Mr. L. A. Miller, of the American Institute of Steel Construction took the attitude that the structural engineer considers rivets as a known quantity and wants to be informed about welding. "Rivets have never failed," he declared. "We deal with steel in stresses and want to know what members to take care of. We want to reduce castings. Lots of work such as joining base plates to columns can be welded, and a start can be made with work of that kind. If every member must be tested this will cost more than to make a joint. You have to know more about stresses before you can get anywhere."

Mr. Ewertz expressed the opinion that in order to make any progress the welding and structural men would have to work together. The representative of one company said that his company was doing a great deal of testing with rivet and spot welding, and that he was convinced that a spot weld was as durable as riveting, but that it is up to the welding industry to show that a saving would result in the entire process. In his opinion, it will be advisable to continue using the present structural members and to develop new shapes as the value of the welding process is proved.

The paper by Mr. H. H. Woofer, of the Thomson Electric Co., "Uses of Spot Welding in the Structural Field," indicated that the use of this system is increasing. The paper pointed to greater strength and increased production as advantages of spot welding.

"Loosening of Rivets," by R. Kinkaid, of the Lincoln Electric Co. In this paper Mr. Kinkaid declared that structural steel can be joined by the welding process at one-third the cost of riveting and added that a disadvantage of riveting is that rivets work loose. Whenever a slight discrepancy exists in the riveted joint, water or atmospheric changes will gradually bring about the loosening. Millions, he said, are spent every year in repairing structures on which rivets get loose. In most cases, he pointed out, welded joints will fill all requirements, and the fact that a welded joint fails is due to not knowing how to weld.

One afternoon of the meeting was spent in an inspection trip. The members boarded busses and visited the pipe line being laid by the Cleveland Illuminating Company, all joints of which are being welded with gas torches. The party then went to the Collinwood Shops of the New York Central Railroad where gas, electric and thermit welding jobs were in process. The third stop in the trip was the plant of the Lincoln Electric Company where production work on motors and other equipment was being done with arc welders. The program included two luncheon meetings, a barbecue dinner and vaudeville show and in the evening a demonstration and motion picture welding exhibit.

This demonstration was put on by the welding school conducted by the Cleveland Y. M. C. A. Mr. F. E. Rogers, of the Air Reduction Sales Co., gave a liquid oxygen demonstration. Mr. T. A. Rye, of the General Electric Co., projected on the screen an image of the electric arc at work. Mr. R. L. Brown, of the Thermit Metal Corp., gave a demonstration of thermit welding.

As stated before, the Cleveland meeting has been termed by more than a few members the most successful meeting yet staged, and much credit is due to Mr. H. H. Dyar, chairman of the Cleveland Section, for arranging an interesting and worth-while meeting as well as an enjoyable and well-balanced program.

RULES HANDLING, USE AND STORAGE OF COMPRESSED GAS CYLINDERS

The Compressed Gas Manufacturers Association have just sent out a bulletin in their technical series containing rules for the safe handling, use and storage of cylinders containing compressed gases. This bulletin has been prepared with the help of all members of the association and has been revised by various committees. It is considered to be practical for general use in its present form. At the same time it is realized that further consideration of the rules and their application may indicate some desirable changes and additions. The association welcomes suggestions. This bulletin states that compressed gas cylinders are safe for the purposes for which they are intended but must not be abused or mishandled. Then the bulletin goes on: (1) General rules for handling cylinders, using cylinders and storing cylinders. (2) Special rules for oxygen cylinders. (3) Special rules for acetylene cylinders. (4) Special rules for combustible gas cylinders. (5) Special rules for carbonic gas cylinders. (6) Special rules for sulphur dioxide cylinders. (7) Special rules for chlorine cylinders. (8) Special rules for anhydrous ammonia cylinders. These rules are all very comprehensive and are extremely valuable to all engaged in the use of compressed gas cylinders.

CUTTING TORCH PART OF POLICE EQUIPMENT

Recent activities of the Los Angeles Police Department indicate that in the future patrolmen may be expected to carry an acetylene torch in addition to the regular equipment of star, whistle, night stick, and pistol.

Not long ago a case came up in which one citizen of the California City charged another with having in his possession a car which was stolen from him. When it came to checking up on the numbers it was found that the car in question did not bear the numbers which were on the car which was stolen.

One of the officers, however, by treating the number plate with an acetylene torch, succeeded in bringing out the original numbers which were pressed in the fibres of the metal. The car was then indentified as that of the plaintiff.

M. Keith Dunham sailed on the Leviathan on November 15, on a business trip. He will spend his time in England and Germany, and expects to return shortly after the first of the year.

Need for Electric Welding Manual

Committee on Electric Welding Puts Across New Manual Which Will Effect Economies on All Roads

THE following article is a comprehensive report made by the Committee on Electric Welding of the Association of Railway Electrical Engineers and accepted by the association. It proposes the various uses of the electric arc process in railroad work. This committee is composed of: E. Wanamaker, chairman, electrical engineer, Chicago, Rock Island & Pacific Railroad; E. H. Hagensick, electrical engineer, Union-Pacific Railroad; G. R. Goddar, general electrical foreman, Illinois Central Railroad; F. J. Hill, chief electrician, Michigan Central Railroad; G. E. Murray, electrical engineer, Grand Trunk Railroad; Ernest Lunn, electrical engineer, Pullman Company; A. M. Frazee, electrical engineer, Duluth, Missabe & Northern Railroad.

To the Members:

Your committee begs to report that in line with the discussion at the semi-annual meeting in Atlantic City, it has prepared a questionnaire which will be mailed out to the mechanical heads of the various railroads shortly after the convention, as indicated herewith.

The electric arc welding process in railway work has developed so extensively that many railway mechanical officers have expressed the opinion that in view of such growth and use in locomotive and car equipment, and especially on such equipment as is offered in interchange, that it would be very beneficial to the railroads if a welding manual was developed that would show at least one safe way for applying the electric arc welding process for each type or kind of job that may be safely and economically performed.

Extensive instructive work of this nature has been perfected for the use of oxy-acetylene welding and is available from many sources, but it seems no extensive effort has been made in co-ordinating the best practices for the application of electric arc welding. The Association of Railway Electrical Engineers has appointed a committee to develop such a manual for electric arc welding which they can—upon completion—present to the Mechanical Division of the A. R. A. for its study and use, should they so desire.

A study has revealed that many railroads have not received full benefits to which they are entitled from the use of the electric welding process, due to their inability to obtain authentic, reliable instructions and practices for their safe guidance in the use of this process.

In view of the existing conditions, the A. R. E. E. is endeavoring to collect from as many railroads as possible, a list of all jobs that are being successfully welded on their individual properties, in order that such applications as have been tried and proven may be included in the manual prepared by the electric welding committee.

It is understood that several roads now have in existence excellent, up-to-date, electric welding manuals, instructions and practices, covering all of the important welding jobs performed.

As soon as sufficient data and information can be collected from the various roads, it is the intention of the committee to invite a number of railroads to volunteer the services of one of their welding and mechanical officers to meet with the committee, so that at least one good method of application for each job be recommended in the manual as satisfactory.

It is felt that such a manual, properly gotten up and maintained up to date, will do much to promote the safe and economic use of this process, and to this end the hearty co-operation of all of the railroads is requested.

In getting up this manual, as a general guide for the application of electric arc welding to the different classes of metals generally used on railroads, the practice employed should be described, including before and after treatment, if any, for the welding of the different metals as follows:

1. Cast steel castings.
2. Rolled steel plates and shapes.
3. High carbon steel.
4. Wrought iron plates and shapes.
5. Gray iron castings (cast iron).
6. Malleable iron castings.
7. White iron castings.
8. Galvanized iron and steel plates.
9. Bronze, brass and other non-ferrous metals, including aluminum.
10. Alloy steels, including tool steel and manganese steel.

It is recognized that the method and procedure required for each of the different metals in use vary widely, depending upon the nature of the service. For example, a common cast steel casting between engine and tender may be restored to dimensions by the use of a metal applied by the electric arc without further treatment and satisfactory service obtained, whereas a worn cast steel coupler shank, when restored to dimensions by the use of a metal applied by the electric arc, should afterwards be annealed, in order to obtain safe and satisfactory service.

In view of this, detailed description—and prints where possible—are desired on some of the more important welding applications, as follows:

Locomotive firebox welding, including type of joint and procedure of applying metal, and where applied in sections, the order of the sections.

Welding of large and small flues, stating whether or not the boiler is filled with hot or cold water during welding, and advantages claimed.

Welding of locomotive frames, including an example of horizontal and vertical members—whether before or after treatment is employed.

The welding of motion parts, exclusive of main and connecting parts, on which welding is not permitted, describing method, and treatment before or after, if any, for each part.

Welding of locomotive cylinders and other cast-iron parts, giving detailed methods employed.

In addition to the above, as much information as consistent on the welding of parts, as follows:

Tender tanks—both repair and construction.

Freight and Passenger Car Equipment:

Truck sides.
Bolsters
Couplers
Axle journals and other castings.

Car frame fabrication, and any other important applications.

Shop Equipment:

Information as to the use of arc welding in the repair and maintenance of shop facilities and equipment will be valuable and should be included, as, for example, the welding on of tool tips and the building up of worn machinery parts.

Track Welding:

While the use of the electric arc in the repair and maintenance of track parts—frogs and crossings—has not been so extensive that a great deal of very valuable work has been

done, it is requested that as much detailed information as consistent be given of such work as may have been performed by each road, including the building up of manganese steel track parts.

It is realized that the information requested will require considerable effort, but it is felt that the effort will be well rewarded when the complete information has been assembled and perfected for the mutual benefit of all.

Your committee has already collected a large quantity of data to be checked and incorporated in the manual during the coming year.

After studying the manuals that have been prepared by different railroads, your committee concluded that the form of manual should be loose-leaf, standard letter size.

Your committee has also made a study that will enable them to draw up a definite method of specifying the size of electric arc welding equipments in such a manner that the various manufacturers can bid on same by using their own equivalent specification; that is, the A. R. E. E. Manual Specification will make it clear to the buyer of a welding equipment as to the actual capacity of the equipments offered him for purchase, regardless of the way in which the specification is expressed by the individual manufacturers.

Your committee has undertaken quite a large task, and the hearty co-operation of all of the members of the association is very much desired.

Respectfully submitted,
Committee on Electric Welding.

AIRCO DAVIS-BOURNONVILLE WELDING INSTITUTE

In line with the engineering assistance rendered to Airco customers through its Industrial Engineering Department, the Air Reduction Sales Co. will organize a special class of foremen, superintendents and other executives at the Airco Davis-Bournonville Welding Institute in Jersey City, Nov. 17th. This special class will be for instruction on the theory and practice of the oxy-acetylene process and the engineering phases of industrial gases, its application and plant distribution.

The Davis-Bournonville Co. conducted this school several years prior to and during the war. The course of instruction fitted men of executive ability to supervise welding and cutting operations in industrial plants. They were trained to make welds in ferrous and non-ferrous metals, steel, cast iron, copper, brass, bronze and aluminum, and were given a course of lectures on the combustion, flame, heat and temperature, the oxy-acetylene torch, gas mixtures, pressure regulators, oxygen, acetylene, acetylene generators, preparation for welding, preheating, welding rods and fluxes, brazing metallurgy, examination of welds, theory and practice of metal cutting, gas pipes and manifolds, safety considerations, welding machines, cutting machines, etc.

The instruction and lecture courses have been revised, extended and brought up to date to include new developments in applications. The value of this particular training course is very evident, for there is an intensive study of torch practice, and the men taking these courses are not trained to be welders. They are trained by actual performances and personal instruction to know what sound welding is, how it can be accomplished, and whether their employees are following the practice which will insure sound work. Among other subjects the lectures deal with the chemical and physical principles employed in the oxy-acetylene torch practice, oxy-acetylene engineering, pipe fitting and welding.

The course extends over a period of three weeks, and the class is, at present, limited to representatives of Airco customers.

The school is equipped with torches, apparatus and machinery for testing and examining welds, including photomicrograph apparatus and Riehle Oxygraph, Radiagraph, Camograph, Pyrograph, Duograph, tube welding machine, section acetylene generator, two 200 pound acetylene generator installation with pipe line, water seals and safety devices, oxygen manifold with pipe line, etc.

C. T. PRICE LEAVES GAS PRODUCTS ASSOCIATION

A farewell luncheon was given in honor of Mr. C. T. Price, former secretary of the Gas Products Association, at the Old Colony Club, Hotel La Salle, Friday, November 7th. Mr. Price is leaving the Gas Products Association to join a member company, the Portland Oxygen-Hydrogen Co., Portland, Ore., in which company he has acquired an interest and where he will act as vice-president and sales manager.

Mr. Price, prior to joining the Gas Products Association, had a long term of railroad and express experience as special agent of the Santa Fe Railroad and general clerk of the American Express Company, together with the management of the Cartage Exchange of Chicago. At one time he was field secretary of the National Metal Trades Association in which capacity he secured a splendid foundation for his successful management of the affairs of the Gas Products Association.

Mr. Price is succeeded as secretary of the Gas Products Association by Mr. Chas. F. Allen. Mr. Allen has quite a record of association work to his credit. For eight years he was general secretary and organizer of the employment and educational departments of the Y. M. C. A. These were followed by four years of sales work in large specialty oil companies. For a period of about three years he was manager of the labor and welfare department of Roessler & Hasslacher Chemical Company. Prior to coming to the Gas Products Association Mr. Allen was field secretary of the National Metal Trades Association.

Mr. M. L. Goodrich, president of the Gas Products Association, presided at the luncheon and expressed the opinion of most of the friends and acquaintances of Mr. Price who were present, that he was sorry that Mr. Price was leaving Chicago, but was glad that he was remaining in the industry. As a token of the Association's esteem and appreciation of Mr. Price's work, he was presented with a beautiful gold watch.

Among the friends and acquaintances present at the luncheon were: M. L. Goodrich of Swift & Co., E. A. Faulhauber and H. B. Pearson of the Burdett Oxygen Company, E. Evleth and E. L. Mills of the Bastian-Blessing Co.; C. T. Allen, new secretary of the Gas Products Association, E. D. Findlay of the Acme Oxygen Co., W. A. Slack of the Torchweld Equipment Co., G. D. Purdon of the Commercial Acetylene Co.; J. B. Coambs of Smith, Lawson & Coambs; E. G. Luening, M. Keith Dunham, C. J. Haines, H. F. McDermott of Wm. Wharton, Jr., & Co.; W. W. Brothers and M. T. Reilly of *The Welding Engineer*, Herman Merker of the Pressed Steel Tank Co.; Leonard Peterson of The Home Insurance Co.; E. Vanna of the International Tank Co.

THE DEVELOPMENT OF IRON ORE INTO IRON AND STEEL

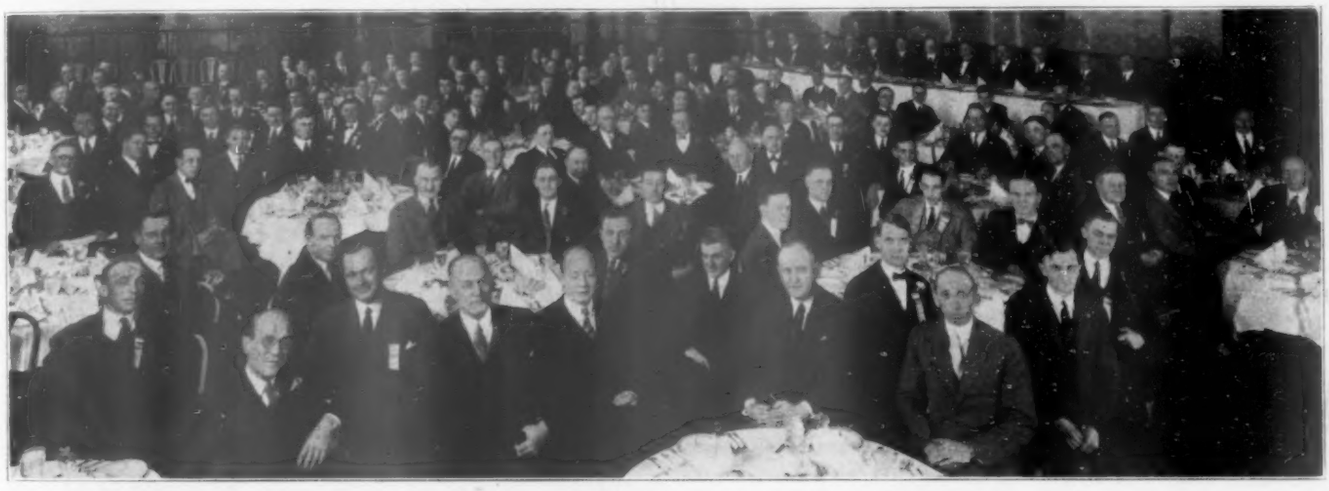
"The development of Iron Ore Into Iron and Steel" is a chart published by S. C. Dickerhoof, Jr., Inc., Research Engineers on Technical Publications, Philadelphia, Pa., and it is furnished in two sizes, 30" x 50" blue print, and 15" x 25" black and white print. This chart is arranged as a simple text for the student, and as a guide for the engineer. It also serves as a source of quick reference. The chart shows in diagram form how the ore, rhinestone and coke are smelted in the blast furnace, how pig iron is converted through the open hearth, bessemer and puddle brass and how it is remelted in the air furnace and the cupola. It goes on to trace the various products clear through to the end, where they terminate in the different finished products. There is also data on the products, on bessemer products, electrical products, cupola brass, and open air products. It quotes the terms used and general notes on iron, steel and typical analysis of iron ore, pig iron, iron castings, wrought iron, billets and sheet brass, steel rails, steel castings, riveted steel and structural steel for buildings.

I. A. A. Holds 25th Convention

Chicago Meeting Sees Boom of Bronze Pipe Welding—Discussion of Underwriters' Laboratories' Rules

MORE than one hundred delegates attended the twenty-fifth Convention of the International Acetylene Association, held Nov. 12, 13, and 14, at the Hotel Sherman, Chicago.

That the acetylene field is active and growing is evident in the manner in which the Association is active and growing. It was a convention teeming with technical interest but at the same time, carrying a program of entertainment for which all attending members must feel appreciative toward the committee of arrangements. By way of diversion from the heavy stress of business there were trips, a theatre party which attended the Greenwich Village Follies, and the banquet following the last business session of the Convention.



Banquet of the 25th Convention of The International Acetylene Association.

The point which was most forcibly brought out by the Convention was the growing popularity of bronze welding of cast iron pipe. This was brought out first in the report of the Oxy-Acetylene Committee, in which it was stated that this work was found to be the most outstanding bit of welding during the past year. It was further demonstrated in the interest which Mr. Swartley's paper on that subject was received. Consideration of the proposed changes in rules by the Underwriters' Laboratories, and a paper on the Utilization of Carbide Residue were other high points of the Convention's interest.

Officers elected for the ensuing year were: W. S. Noyes, of the Imperial Brass Company, president; R. A. Sossong, Air Reduction Sales Company, vice-president; A. Cressy Morrison was re-elected to the office of secretary-treasurer. H. S. Smith, of Prest-O-Lite, and E. L. Davis, the retiring president, were elected directors.

Wednesday Morning Session.

Following the preliminary business of registration, the Wednesday morning session was opened by the president, E. L. Davis, of the Acetylene Stove Co. W. A. Slack, of the Torchweld Equipment Company, delivered the address of welcome to the members, pointing out in his address the growth of the industry and the association since the birth of the association some twenty-five years ago. L. E. Ogden of the Ox-weld Acetylene Co., responded to this address on behalf of the attending members.

In his address, President Davis dwelt on the subject, "What Good Has the I. A. A. Accomplished?" He enumerated as answers to this question the disseminating of information, the forming of regulatory bodies which improved standards and conditions of the industry, raising of the prestige of the industry, and the consideration and solving of problems of the future. A. Cressy Morrison, secretary of the Association, gave the reports of the secretary, treasurer, and legislative committee, and read the report of the auditing committee.

Utilizing Carbide Residue.

One of the high points of interest in this session was the paper read by J. J. Murphy, of Prest-O-Lite, on "The Utilization of Carbide Residue." "Formerly," stated Mr. Murphy, "Carbide residue constituted a liability, it being necessary for acetylene manufacturers to buy tracts of land for dumping it. The present day, however, finds various uses and demands for this material, making of it an asset instead of a liability."

Mr. Murphy listed a number of experiments and tests conducted throughout the country, Ohio State University, Columbia University, Massachusetts Institute of Technology, and several other places, which had demonstrated the value of carbide lime in making mortar for buildings. In Columbus, Ohio, the author pointed out, this lime is being made into lime stone blocks, from which several hundred houses have been built. Following the experiments conducted at Columbia University, the Bureau of Building Standards of the Borough of Manhattan approved the use of carbide lime for building mortar. Mr. Murphy's paper mentioned as assets of carbide lime fineness, high calcium content, and high plasticity. The author also made mention of the growing practice on the part of builders to buy ready mixed mortar instead of buying the components and mixing at the place

of construction. Carbide lime fills a great demand in this field of ready made mortar.

The paper also dwelt on the use of carbide lime in the manufacture of slag lime bricks and slag lime board—similar to gypsum board. Mention was also made of the use of carbide lime in France and Germany as fertilizer, as a component in "acoustic plaster," being used in the building of public schools in Cleveland, but on which patents have not yet been released. The paper also mentioned the use of this material in the preparation of the pulp in paper mills, and in the purifying of beet sugar.

This session of the convention closed with an address by Dana Pierce, president of the Underwriters Laboratories, in which he gave what he termed a restatement of the Laboratories' policies and methods.

The afternoon session was given over to the open meeting of the House Lighting Committee and the open joint meeting of the Oxy-Acetylene and Technical Committees. Both of the last mentioned committees were unanimous in expressing the desire for standardization in the industry, and at a special meeting held later, went on record as favoring standardization of hose-connections on all welding equipment.

Following these meetings a group of some thirty members of the Association visited the plant of the Bastian-Blessing Company, and were conducted through the different departments of the plant, observing the manufacture of that company's line of welding and soda fount equipment.

The business of the Thursday morning session consisted principally of the report of the Oxy-Acetylene Committee and the discussion of the Underwriters' Laboratories Construction Rules pertaining to acetylene generators and equipment. The report of the Oxy-Acetylene Committee was read by Chairman C. A. McCune, of the Page Steel and Wire Company. This report mentioned pipe welding and railroad repair as the fields which had shown the greatest increase during the past year, allusion being made to the great pipe lines of hundred and two hundred-mile lengths being laid in the Texas and Oklahoma oil fields. The bronze welding of pipe was listed as the most outstanding bit of acetylene welding, while the dismantling of obsolete battleships was termed the most outstanding bit of acetylene cutting. Mr. McCune explained that the report had been prepared along the lines of a questionnaire which was issued throughout the industry. He said that the experience of the committee in securing this information prompted the committee to urge the members to keep in closer touch with the Association.

Discussion of Underwriters' Rules.

The discussion of the Underwriters' Laboratories rules was conducted by E. J. Smith, of the Laboratories. The convention voted to approve the proposed rules and changes pertaining to lighting equipment, but on those rules and changes concerning welding there was considerable discussion, and many of the changes were recommended for further discussion and consideration by the joint meeting of the conference committee and the Laboratories.

Considerable discussion took place on a rule designed to incorporate in acetylene generator assembly a positive stop in the feeding mechanism acting independently of the regulating mechanism. With a slight change in wording this proposed ruling was accepted by the Convention. It is a revision of Rule 4 (e), and now reads as follows:

> "To be so arranged that the automatic feeding of carbide will be prevented while recharging with carbide, by means of a positive stop acting independently of the automatic operation of the regulating mechanism. This stop must be of the type independent of springs or friction brakes, but may be designed to be actuated by gravity."

A proposed ruling to do away with the use of cotter keys in the assembly of generators also provoked quite a bit of discussion and was ultimately modified to mean that they should not be used "where failure of such pins would involve a hazard."

Three rules dealing with the protection from corrosion of steel parts of generators were recommended for further consideration by the joint meeting of the Laboratories and the conference committee. These proposed rulings were:

> "Iron or steel sheet metal and castings should be coated to prevent corrosion unless such parts are so located as to be coated with lime or sludge."
>
> "Plates of generator shell, if not galvanized, to be not less than two gauges heavier than above specified." (3/16 in.)
>
> "Welded joints on galvanized parts where not in contact with lime or sludge should be recoated with solder or its equivalent on the inside."

The matter of acetylene relief valves also occasioned considerable discussion. The Underwriters' Laboratories reported that the desirability of sliding stems had been discussed at length with a manufacturer. The manufacturer's arguments were given for consideration. They follow here:

> "The valve stem is never in communication with the acetylene atmosphere except when the valve functions to relieve the pressure in the generator. Under these conditions, the acetylene atmosphere in the outlet chambers of the blow off valve cannot conceivably reach a tangible pressure. Even were the packing facilities inadequate or probably entirely removed, the leakage of acetylene into the room would be negligible."

In this connection the Laboratories suggested the following revision of Rule 11.:

> "Stuffing boxes leading from gas parts or leading from parts, that will be subjected to gas pressures in event of diaphragm or similar failure to the outside of the shell, if used, to be of the rotating shaft type or the equivalent, etc."

This ruling was recommended for further discussion by the joint meeting, as was the proposed change in Rule 12—dealing with the construction of purifiers, scrubbers, and filters.

> "When located outside of gas holder, not to have hand holes, the covers of which are secured by removable clamps or thumb screws, except where an interference arrangement is provided to shut off the gas supply before opening. When the outlet to the service line is connected to the cover plate of the filter or when secured by a minimum of six bolts, no interference is required."

The Underwriters' Laboratories proposed three additions to Rule 24, having to do with relief valves. They follow here:

> "Relief valve shall be provided with adjusting screw of such length that when screwed down to the shoulder of the valve bonnet, internal pressures shall not exceed 15 lbs. per sq. in."
>
> "Relief Valve shall be of such design that the internal pressure shall not exceed 15 lbs. per sq. in. when discharging three times the rated output, in cubic feet per hour, through relief valve discharge with normal outlet closed."
>
> "Relief Valve shall be of such design that the blow-down will seat at a pressure of not less than the maximum operating pressure for which the machine is set to normally operate."

In the discussion which came up in regard to these rules, the 15 lb. per sq. in. requirement became an issue. It was

suggested by one member that the limit be raised to 17 pounds, in order to make legitimate the 10 per cent excess which is commonly accepted. Serious objection, however, was voiced to any such step, it being pointed out that the 15 lb. limit was a standard of long standing with the Association, and that any stretching of this standard was to be discouraged. These proposed rulings were, after considerable discussion, recommended for further consideration by the joint meeting of the conference committee and the Underwriters' Laboratories.

Bronze Welding of Pipe.

The afternoon session was devoted to the paper by H. R. Swartley, of the Linde Air Products Co., on "Bronze Welding of Cast Iron Pipe," accompanied by motion pictures and slides ,and a three-reel picture exhibited by the U. S. Cast Iron Pipe Foundry Company.

Mr. Swartley's paper dealt principally with the laying of a gas pipe line in Long Island where all joining was done by bronze welding, and more generally with the experiments and tests on bronze welding of pipe. The paper pointed out the ease with which iron pipe may be joined by bronze welding, citing the much lower temperature at which the joining may be made than with other types of welding. Results of tests and experiments were also given showing the strength of bronze welded joints, one being the sledge hammer test in which a joined section was struck four blows with a sledge without any result. Four more blows were struck and the pipe cracked longitudinally between one end and the bronze collar, which remained perfectly intact. and stopped the crack. Further blows of the sledge shattered the pipe but all pieces still adhered to the bronze collar which withstood the entire strain.

The paper described other experiments which tested the strain resisting qualities of bronze joints. Welds joining 12 foot lengths of the pipe were subjected to the strain of heavy suspended weights. These tests demonstrated the value of such joints in the lowering of great lengths of pipe into trenches after having been welded along the line. The moving picture following Mr. Swartley's paper illustrated such pipe work in actual progress, from the welding of the joints to the lowering of the completed line into the trenches.

A three-reel film was next shown by the U. S. Cast Iron Pipe Foundry Company, illustrating the manufacture of sand cast pipe and the DeLavaud process of centrifugally cast pipe. Both these pictures commanded the keenest attention from the attending members.

Friday Session.

The Friday morning session began with a paper by T. M. Hyland on "The History of the Miner's Carbide Lamp." This was followed by the discussion of the proposed New Rules of the National Fire Protection Association. This discussion consumed the remainder of the morning session.

The afternoon session was opened with the paper by G. O. Carter, of the Union Carbide Company, on "The Management of Pipe Line Welding. This was followed by a paper and demonstration by E. A. Bienenstok, of the Milwaukee Tank Works, on "The Automotatic Acetylene Welding of Tanks." In this paper Mr. Bienenstok described the process being employed by the Milwaukee Tank Works in automatically welding the straight and circular end seams on oil pump and storage tanks. One of the machines was mounted on a 54-inch galvanized tank for a demonstration. Without any actual welding the principle of the machine was demonstrated, showing how the circular rim guides the torch and how the flame oscillates as it progresses along the rim.

Another very interesting paper was that by E. L. Swangren on "Some Applications of the Oxy-Acetylene Process." Mr. Swangren is head of the welding department at the large Hawthorne plant of the Western Electric Company, and his paper described the introduction and growth of the process in the plant. He also enumerated some of the many and interesting uses to which welding had been put, and described the training and management of welders in such an institution.

The convention next entertained the reports of the various committees: House Lighting, Appliance, Membership and Resolutions. Following the acceptance of these reports came the election of officers for the ensuing year.

At the banquet which was held that evening in the Tiger Room of the Hotel Sherman there was a decided departure from the strictly technical and business tone of the three days' preceding. Papers, reports and discussions were forgotten for the time being in favor of more diverting and convivial association. John V. Moorhead presided as toastmaster, and introduced to the assembled members a number of very entertaining speakers. As president-elect Noyes made the closing tap of the gavel enthusiasm and good-fellowship was running high among the delegates to the Twenty-fifth convention of the International Acetylene Association.

A CHAPTER IN AMERICAN EDUCATION

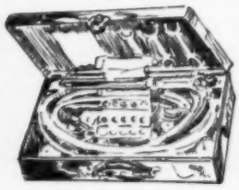
A Chapter in American Education, by Ray Palmer Baker, Ph. D.—This book has recently been released by Chas. Scribner Sons, N. Y. It is a volume of 170 pages, cloth bound, and is termed by the author a "Memorial of the one hundredth anniversary of the foundation of Rensselaer Polytechnic Institute." It is not merely a catalog nor listing of the many alumni of the Institute who have made their mark in the technical and industrial work, but is rather a study of the original aim of the institution and its effect on American education. In an historical way the book traces the work of the Institute from the time of its founding by Steven Van Rensselaer and Amos Eaton, through the period of early ventures in American education to the present time. It points out the novelty of the Institute's position as the first school giving particular attention to the sciences—agriculture, chemistry, and scientific research. In the words of the author, "Because of its primacy as the first college devoted to the sciences which has existed continuously for 100 years its history is a subject of universal interest." The author traces the effect and growth of this early idea as applied to the learned professions, public services, canals and railroads, structures and mechanisms, business, industrial and engineering education.

CHEMICAL ENGINEERING CATALOG

The ninth annual edition of the Chemical Engineering Catalog is just off the press. It is bound in brown leather and consists of 1,082 pages. This book is a large size, being 9x11½ inches and 2 inches thick. It is very well printed, illustrated and made up, and is a valuable source of information as it serves the following industries: Cement, chemicals, coke by-products, drugs and medicines, dyestuffs, electroplating, explosives, fertilizers, foods and beverages, gas, glass and ceramics, leather, metals and alloys, oils, paints and varnishes, petroleum products, paper and pulp, refractories, rubber, soap, sugar, textile finishing, toilet preparations, waste recovery.

The first part of the book is a catalog section alphabetically arranged. The next part consists of the products of various large organizations while the last part of the book deals with technical and scientific books. Many hundred firms are listed in the classified directory of this book, and it should be of great help to anyone who is in the market for any of the products of the above-mentioned industries, and is worthy of a place on any desk.

REGO Outfits.



There is a REGO outfit for every type of work, from the fine work of dentists and jewelers to the large welding and cutting jobs encountered in industrial shops. Each outfit is packed individually in a carrying case or carton. Prices are attractively low.

REGO Portable Kerosene Preheaters

REGO Portable Preheaters are quick, clean and economical. Consist of a fuel tank, pump and burner. A few strokes of the pump every half hour keeps them going. Large size develops flame 2½-foot — small size, a 9-inch flame.

8K—10-gal. tank —each $60.00
11K— 1-gal. tank —each 22.50

REGO Welding Torches DO NOT BACKFIRE

Try this test—Heat a REGO Torch head with another torch flame — Even then there will be no backfire.

REGO Compressed Air Preheaters

Use low grade kerosene and operate on compressed air at 80 to 90 pounds pressure. Quality of flame can be varied from intense heat sufficient to melt cast iron, to soft voluminous flame for preheating.

9K—Complete .. $30.00
10K—(as illustrated) 15.00

REGO Tip Mixing Welding Torches

By drilling the mixing chamber as a part of each tip, the correct proportion of gases for each size tip is obtained without the inconvenience of constantly changing separate mixing chambers. Each torch comes complete with assortment of 5 tips. Prices

L Torch—Length, 22 in. $37.50
MT Torch—length, 19 in. 27.50
S Torch — length, 17 in. 20.00
W Torch—length, 14 in. 15.00

REGO Cutting Torch

Length, 20 Inches. REGO K cutting torch eliminates the trouble of leakage in the H. P. oxygen valve encountered in most cutting torches. The long H. P. control lever used permits the use of an exceptionally strong valve closing spring which is controlled by a slight touch of the finger. Each tip has its own mixing chamber.

Price—K torch and 5 tips $55.00

REGO

WELDING AND CUTTING APPARATUS

IS SOLD BY

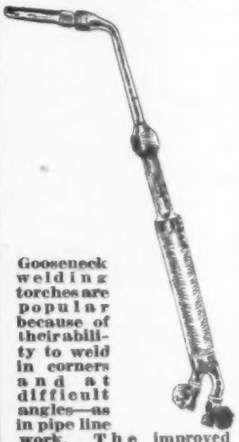
Two hundred fifty gas companies, jobbers and service organizations throughout the U. S. Each carries a stock of REGO Apparatus and is equipped to take care of your needs. The Sales Service Representative in your territory will tell you where the nearest stock is located.

REGO SALES SERVICE REPRESENTATIVES.

Carter Welding Company of Toronto, Ltd. ..... 165 Adelaide Street, West, Toronto, Ont., Canada
Courtney-Eck Company ..... 441 Douglas Bldg., Los Angeles, Calif.
Courtney-Eck Company ..... 914 First Avenue, South, Seattle, Washington
Courtney-Eck Company ..... Sharon Building, San Francisco, Calif.
Kentucky Oxygen-Hydrogen Co. ..... Logan St. & Goss Ave., Louisville, Ky.
National Welding Equipment Company .. 419 South State Street, Syracuse, N. Y.
St. Paul Welding & Mfg. Co. ..... 174 West Third Street, St. Paul, Minnesota
Southwest Welding Supply Company .. 502 North Harwood Street, Dallas, Texas
Weldox Equipment Company ..... 359 West 52nd Street, New York, N. Y.

MANUFACTURERS
THE BASTIAN-BLESSING COMPANY
246 E. Ontario Street Chicago, Illinois

REGO Gooseneck Welding Torches



Gooseneck welding torches are popular because of their ability to weld in corners and at difficult angles—as in pipe line work. The improved REGO gooseneck mixes the gases AWAY FROM the operator's hand.

Prices

REGO GL Large Welding Torch—with 6, 12 and 24-inch extensions and 10 tips $65.00
REGO GM General Welding Torch — with 6 and 12-inch extensions and 9 tips. $40.00
REGO GS Light Welding Torch—15 inches long—5 tips $20.00

REGO Cutting Tips

REGO Cutting Tips are made of copper, selected because of its unusual heat resisting properties. The mixing chamber is drilled as a part of each tip (patented construction)—so that each tip has a mixing chamber which gives just the right proportion of gases for maximum efficiency.

Price, each $3.00

Special Tips

Tips for other gases than acetylene, such as hydrogen, pyrogen, butane, etc., as well as special tips for rivet cutting and sheet metal cutting may be had if specified.

Price, each $3.00

REGO Single Tank Holder

REGO B Single Tank holders hold 200 foot standard oxygen and hydrogen tanks. Convenient for moving tank from place to place when burning carbon, filling balloons, etc.

Price, each $4.50

REGO Cutting Torches DO NOT BACKFIRE

When making those long cuts through heavy metal and the reflected heat gets the torch head red hot—then is when you appreciate the advantages of REGO non-flashback cutting torches.

REGO Tank Manifolds

For the large oxygen user. Made of ¾-inch extra heavy brass tubing and bronze fittings. Furnished in either tripod or wall type for any number of cylinders.

Write for quotations.

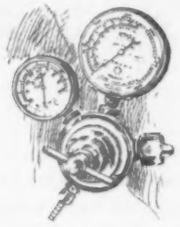
REGO Welding Tips

The accurate drilling of pure copper is a difficult job, but by developing special tip drilling machines, PURE COPPER welding tips have been made practical and are a part of the REGO line.

REGO Loose Diaphragm Regulators

REGO Loose Diaphragm regulators are easy to repair. The diaphragm is clamped in place by the bonnet, which can be readily removed. The regulator can be taken entirely apart without the use of heat. Prices same as for soldered diaphragm type.

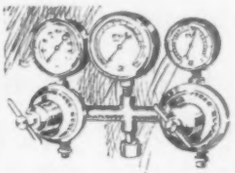
REGO Oxygen and Hydrogen Regulators



REGO double gauge regulators are strongly built, accurate regulators for all kinds of work where constant delivery pressure is essential. Are equipped with safety devices which protect user against accident.

Price—Large size (2⅝" diameter) $28.00
Small size (2" diameter) 18.00

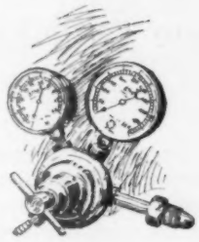
REGO Manifold Regulators



REGO manifold regulators provide for an exceptionally large flow of gas. Are used as master regulators, regulating supply line pressure, and for large welding and cutting jobs where gas requirements are heavy.

Prices quoted on application.

REGO Acetylene Regulators



REGO double gauge acetylene regulators hold a constant pressure right down to the last of the tank. Furnished with P. O. L. welding cylinder inlet as standard—others on specification.

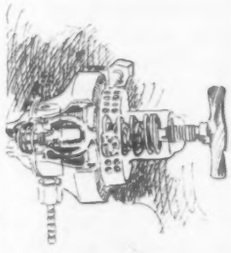
Price — large size (2⅝" diameter) $22.00
Small size (2" diameter) 15.00

REGO Single Gauge Regulators

When it is not necessary that the operator know how much gas there is left in the tank, or how much is used on each job, REGO single gauge regulators will fill the bill. Same in all respects as double gauge regulators, except that they have no H. P. gauge.

Price — Large size (3" diameter)—all gases $16.00
Small size (2" diameter) — all gases 11.00

REGO Regulator Details



REGO regulators are sensitive over a wide range of pressures because they have DOUBLE SPRINGS in the bonnet. At high pressures the heavy, and at low pressures the light spring carries the load. The REGO shut-off action is positive because the GAS PRESSURE ITSELF shuts off the flow.

Adequate safety devices for the protection of the operator include grilled safety bonnet, diaphragm shearing device and non-combustible interior.

There is a REGO Regulator for every sort of work. Write the manufacturer regarding your special problems.

"THE BEST EQUIPPED SHOP GETS THE BUSINESS"

In this day of specialization and competition the welding shop must have the best and most up to date equipment obtainable to remain in the running. If your gas costs run half again as high, and your labor half again as much as your competitor—he is going to get your business.

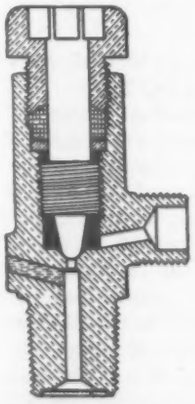
By equipping your shop with REGO you know you have the most up to date and efficient oxy-acetylene apparatus on the market.

THE BEST EQUIPPED SHOP IS THE REGO EQUIPPED SHOP

REGO Acetylene Generators

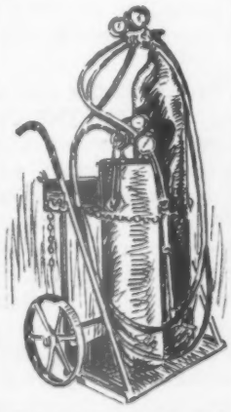
REGO Generators have a 20% over water capacity, which enables them to deliver clean, cool gas at all times, and to stand an overload without danger. Made in 50, 100, 200 and 300-lb. sizes. Prices on application.

REGO No. 733 Acetylene Drum Valve



Made with both ¾" and 1" shank.
Write for quotations.

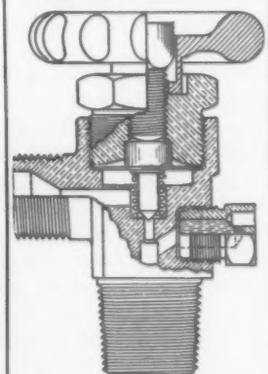
REGO Two Tank Trucks



For moving tanks and apparatus about the shop.

Style A truck, each $16.50

REGO No. 751 Diaphragm Drum Valve



A needle point seat and diaphragm type of drum valve eliminates leaks in seats and around stem.

Write for prices.

REGO Plant Equipment

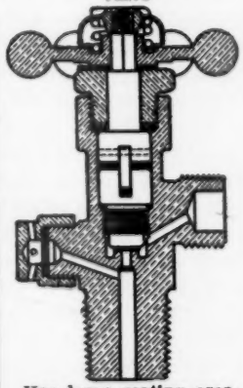
The REGO Line includes charging manifolds, gauges, brass pipe, bronze fittings, etc. for high pressure gas plants.

The Manifolds are made of sections of ¾" brass pipe screwed into bronze fittings. This construction makes it a simple matter to add on extra sections when needed. The pipe and fittings have been tested under 10,000-lb. pressure, providing an ample factor of safety.

The ¾" brass pipe, bronze tees, elbows, crosses are also sold separately for making plant installations.

Prices on Application.

REGO No. 962 Oxygen and Hydrogen Drum Valve



Has large seating area. Easily renewed soft metal seat cannot be damaged by dirt or particles of rust.

Write for prices.

Carbon Electrode Welding in R. R. Shops

There Are Many Possibilities for this Process in the Railroad Welding Shops

By Juan St. Cere*

IT has been, and still is, the practice in most railroad shop welding departments where electric welding is practiced to use the metallic electrodes for almost every class of welding, from boiler patches and motion work down to the most common class of bench work. My experience has shown that many dollars can be saved in labor and material by installing a higher powered machine. The carbon electrode machine, I have found, is a very efficient piece of equipment to use in such a common operation as plugging holes and building up worn surfaces on parts which are stripped from the engine and repaired on the bench. It is wise, however, to use a metallic electrode for higher class work where intense heat is not wanted and where a minimum of expansion is required.

We have a small casting known locally as a trailer spring saddle guide. In changing this piece of equipment to meet certain alterations it is necessary to plug four 1¼ inch holes, 1½ inches deep and to build up a chafing surface from 1/16 inch to ½ inch. Sometimes this chafing surface must be built up more depending upon the amount of wear to which it has been subjected. This worn surface is usually 2 inches wide by 13 inches long and with the carbon electrode using boiler punchings as filler metal the holes may be plugged in about one-half hour and the worn face of the casting can be renewed in about the same length of time. When renewing the worn face of the casing a ½-inch soft steel rod is used as a filler metal. The material does not lay at the bench so long and the work can be machined, drilled and replaced sooner. In this way the whole job is moved right along through the shop and back into service in a short time.

For those who have not had the opportunity to study this process I would like to explain it. The difference between carbon electrode welding and metal electrode welding is found in the fact that the arc is drawn between the carbon electrode and the work. The filling rod is fed into the arc separately and does not carry the arc's current as does the metal electrode. Carbon electrode welding is in every way similar to oxy-acetylene welding. Carbon welding is a semi-casting process inasmuch as the parent body to be welded is reduced at the welding point to a fluid mass and the metal to be added is puddled directly into the mass or practically cast together. The operation may be taught to a novice in about one week's time. When carbon electrode welding is properly performed there is no excessive hardening of the metal. However, if the carbon electrode is made positive instead of negative the carbon monoxide comes in contact with the molten metal, carbonizing it and giving a hard weld. The carbon electrode should properly be used on the negative side of the welding circuit. When it is used on the positive side the arc is extremely unstable.

My experience has shown that successful welds can be made with 75 volts and 250 amps. to 300 amps. using 3/8-inch to 5/8-inch or ½-inch carbon or graphite electrodes with an arc length not less than ¼ of an inch.

Cast steel is subject to sand holes and pockets and where such a casting is broken the carbon will fuse the sand pockets out of the steel. In this case the casting is set in such a position that the molten metal will flow from the defective spot. The arc is then applied to it and the defective metal is melted away. A filling rod is then used to add new metal. The metallic electrode cannot do this work as well due to the comparatively lower temperature.

It is possible to build up bearing surfaces on brackets and castings where tensile strength is not a factor and this work can be done quickly and economically with a ½-inch soft steel rod used as the feeder. This is quickly fused into the bearing metal. Holes of any size may be filled in by using boiler punchings or rod shearings and fusing them into a solid mass. The hole to be plugged drops into one or two pieces at a time and these are melted down until the hole is filled regardless of the size.

A few months ago we had a cast steel box casting shipped here from another point. It was to be welded. A piece 3 feet 6 inches was broken entirely off one end. The job was a rush order. The material was 1½ inches thick and I made this weld using 75 volts 250 amps. The time consumed was one and one-half hours and a 3/8-inch filler rod was used. After completing the weld we shipped the job without machining it and our latest report shows that it is still in active service.

While I have boosted the carbon welding process, it must also be understood that carbon welding has its limits for it is confined to certain classes of work. I have found it can only be used on flat jobs, work that may be arranged horizontally to the electrode, and that it will make better welds on cast steel because the weld is also cast steel and the fusion is absolute and not a series of layers gradually built up. A higher temperature is maintained throughout the weld and the chilling is not so abrupt. Contraction is more even and stress from this cause is not so intense because the slower cooling acts slightly like an annealing factor.

Satisfactory carbon welding depends upon skillful operators and the following are just a few of the rules which must be followed:

1. Sufficient power to furnish an intense arc say 250 to 300 amps. 70 to 80 volts for the ordinary run of work although in the steel foundry where the carbon electrode welding is used commercially to correct defects in steel castings the arc current is as high as 600 amps. in some instances.
2. 3/8 to 5/8-inch carbon electrodes should be used.
3. An arc of ¾-inch to 1-inch long should be allowed for the oxidation of released carbon in the reduction of parent body to the fluid mass before adding the filler metal.
4. Both parent and filler metal should be thoroughly puddled without cold spots or slag pockets being present.
5. Finish your weld as you go along. Do not go back and play the arc over it to smooth it up as this will cause a carbonized surface which is extremely hard.

*Welding Foreman, New York Central R. R. Co., Depew, N. Y.

METALLURGY OF ALUMINIUM AND ALUMINIUM ALLOYS

"Metallurgy of Aluminium and Aluminium Alloys" is a new book by Robert J. Anderson, well-known metallurgical engineer and technical specialist on aluminium. This new volume is published by Henry Carey Baird & Co., Inc., New York, and consists of 800 pages and 897 illustrations. It will be ready for distribution in January, and the price will be $10.00 net. This volume is a modern and practical treatise on the metallurgy of aluminium and light alloys, covering the subject from the mining of the ores to the fabrication of the metal and applications thereof. It contains a great many practical and theoretical aspects of the subject, and contains a great deal of statistical data which is of interest and also very useful to all in the metal industry. It is a very worthwhile and complete text book covering this subject.

First Aid to Farm Machinery

Competent Oxy-Acetylene Operator Can Cheat the Scrap Pile and Render an Invaluable Service to the Farmer

By T. C. Fetherston*

FEW farms, indeed, have no graveyard for old machinery and parts. A passerby, familiar with factory methods wonders at the dismantled wrecks of mowing machines, once resplendent in shining red and yellow paint, now rusting in a clump of burdock and wild blackberry. Perhaps all that is wrong is a broken axle. A crippled tedder, that might still be kicking out the long windrows of hay in the low meadow on July mornings but for a stripped and toothless gear and a bent cam-shaft, disconsolately forms a rusty trellis for wild morning glories.

Dozens of smaller parts are always there, too. A flywheel from the thrashing machine, with a chunk missing from the rim. A broken pump handle. Cracked transmission housing from the tractor—how long was the spring plowing delayed while the tractor was laid up waiting for the new one to come in? Plow points, dozens of them; and half a hundred small wheels, gears and pinions. Parts from the car and the trucks. Harvester parts, cultivator parts, parts from the gas engine and windmill—no one could name them all.

Such a scrap pile nearly always is to be found on the best managed farms as well as those run by the old methods. In fact, the better equipped the farm, the larger is likely to be the heap of discarded metal parts. Modern machinery converts the up-to-date farm into a well ordered manufacturing plant. This situation is followed by the manufacturing plant's problem—the maintenance and repair of machinery.

Besides the fact that it is an unsightly heap of junk, possibly even dangerous to children and to live stock, a haven for field mice and sparrows and a fire hazard from the tall dry stalks of the overgrowing weeds, what does this scrap pile mean? What significance has it to the owner of the place?

It is a monument to waste.

Every piece on the scrap pile has had to be replaced. From the mower to the smallest sprocket every item was once important and necessary, and when thrown away a new part had to be bought so work could go on.

Industrial plants, faced with the same problems, solve it with the aid of the oxy-acetylene welding process. Many scrap piles representing thousands of dollars in machinery have been wiped out never to reappear and the salvaged parts not immediately required have in many instances formed a reserve supply to be drawn upon as needed. The savings made in these plants have justified the investment in welding equipment many times over.

However, to reclaim worn or broken farm equipment it is not necessary for the farmer to buy welding apparatus. The nearest job welding shop will fix it.

With the oxy-acetylene welding blowpipe in the hands of a competent operator all sorts of worn and broken parts can be repaired—more than "Repaired" in the ordinary sense of the word—actually made as good as new. Cracked castings can be welded, missing gear teeth replaced, worn sections and surfaces built up. Malleable castings can be brazed, and the part will be as strong as originally. Steel parts can be made over; plow points built up with an alloy steel welding rod will give service like new ones. Bent shafting can be straightened easily by heating with the welding blowpipe.

New parts and new equipment can also be fabricated by welding. One stock farm bought a number of old hot water tanks (range boilers) from a junk dealer, cut them into halves with an oxy-acetylene cutting blowpipe and after welding pieces of old pipe to them for legs, used them for stock-feeding troughs. On another place a chute for bags of grain was made by welding old pieces of steel sheet, bought very cheaply from a scrap yard.

It is in the repair of damaged parts, however, that the greatest savings can be made. The actual saving in dollars and cents is a large figure, but the greatest saving is the time necessary to secure a new part.

Take, for example, a typical instance. There are ten acres to be plowed for fall wheat. Disc-harrowing will not do, the ground must be turned over. The first morning an accident to the tractor puts it out of service with a crack in the cylinder block.

A new block can be obtained only from the factory, and this will take weeks. Added to the cost of the new block is the freight or express and, unless the work can be properly done on the farm the cost of installing the new block. In the meantime the plowing waits, unless a man and a team of horses can be put on it.

Welding will do away with nearly all of this delay, and much of the expense. The cracked block is simply removed from the tractor, and taken to the nearest welding shop. There it is carefully preheated, the crack welded and the casting slowly cooled—all of this work will not take a day.

And the results are very much worth while. The scrap pile is cheated. The cost of a new cylinder block is saved. But best of all, the plowing can go right ahead.

This incident is but a sketchy illustration of the possible value of oxy-acetylene welding on the farm. Hundreds of similar instances might be cited of savings that are now being made, or that could be made were the value of this reclamation process known to all who could take advantage of it.

Whenever metal parts seem ready for scrap, don't throw them away and pay good money for new parts until you consult the job welder. Let him doctor your sick equipment and save it from the graveyard.

*Union Carbide Sales Co.

AMERICAN WELDING SOCIETY SEES NOVEL WELDING AND CUTTING DEMONSTRATIONS

The Pittsburgh section of the American Welding Society, in its meeting of October 17, 1924, was treated to a discussion and demonstration of "A New System of Arc Welding and Cutting," by Mr. Andrew Smith, manager of the Smith Metal Perforating Co., 707 Forbes St., Pittsburgh.

In order that the attending members of the society might be given a complete and comprehensive demonstration of the new system, the meeting was held in Mr. Smith's offices, after which Mr. Smith conducted the members of his adjoining shop rooms and exhibited his processes.

This new system of arc welding and cutting is the result of a number of years experimentation and development by Mr. Smith. It includes special welding panels, designed to make possible more accurate control of the arc, a migratory arc, and a non-consuming electrode.

A paper, describing this system in detail, is being prepared by Mr. Smith and will be published in an early issue of *The Welding Engineer*.

The Allan Manufacturing & Welding Company, Inc., of Buffalo, N. Y., have recently issued a folder describing the Almanc electric welding and cutting equipment. It also deals with other welding accessories which they manufacture, such as helmets, shields and electrode holders.

The Welding Engineer

Founded by L. B. Mackenzie, 1916
Reg. U. S. Pat. Office.
Published on the 17th of Each Month by

THE WELDING ENGINEER PUBLISHING CO.,
608 S. Dearborn St., Chicago, Ill.
Telephone Wabash 7134.

G. H. Mackenzie.....President and Treasurer
W. W. Brothers.....Secretary

W. W. Brothers.....Editor
M. T. Reilly.....Associate Editor

Subscription payable in advance and postage free.
United States and possessions and Canada.....$3 a year
Foreign Countries .....$4 a year
Single copy, domestic .....25 cents
Single copy, foreign .....30 cents

Entered as second-class matter January 20, 1916, at the postoffice at Chicago, Illinois, under the act of March 3, 1879.

The Welding Engineer is a member of the Audit Bureau of Circulations and of the Associated Business Papers, Inc.

Last Advertising forms close at 8:00 a. m. on the 15th. To show proof for correction copy must be received at an earlier date and allowances should be made for delay to mails. All copy should be in by the 12th of the month at the latest.

The Welding Engineer does not publish in its news or advertising columns any matter that deals with or refers to either personal or legal controversies.

The Welding Engineer in Great Britain

Capt. D. Richardson, Northampton Polytechnic Institute, Clerkewell, London, E. C. 1, England, is our accredited representative in Great Britain for obtaining new subscriptions to The Welding Engineer and The Welding Encyclopedia.

The Welding Engineer in Australia and New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in Australia and New Zealand for obtaining new subscriptions.

VOLUME 9 NOVEMBER, 1924 NUMBER 11

CONTENTS

Welding Ousts Rivets..... 19
Report on Electric Welding..... 21
I. A. C. Holds 25th Convention..... 23
Carbon Electrode Welding Used in R. R. Shops..... 28
Welding Broken Farm Machinery..... 29
Editorials 30
Welding in New Industry..... 32
Helping the Pipe Welder..... 34
Welding in the Big Plant..... 41
News of the Welding Trade..... 44
Current Welding Literature..... 48

In the Future as in the Past

DESPITE the deeply felt absence of our President and Editor, Louis Burton Mackenzie, we, of *The Welding Engineer* staff, will carry on in the future just as he did in the past. We will strive in every way to make *The Welding Engineer* and *The Welding Encyclopedia* serve as a fitting monument to his memory. He was their founder, president and editor, a pioneer in the welding industry. He fearlessly and wisely advanced the art and science of welding in all its forms. The industry can but honor him and express its appreciation of his faithful services. These things it has done. We wish to sincerely thank you all for your kind expressions of sympathy in our great loss.

The policies of *The Welding Engineer* will remain unchanged. They have been formed as a result of long association with the welding industry, and they have been wisely and definitely decided upon. *The Welding Engineer* is honest, impartial and unbiased in its editorial columns. A keen sense of fairness and rightness decides all things.

While we appreciate and realize the magnitude of the task before us, we are confident of success. We are confident because of the many, many letters which we have received from all parts of the large territory covered by the welding industry. These letters were full of sympathy, love and willingness to help. Sympathy for his family and us in our great loss, love for him as a man and a friend, and willingness to help in carrying on his great work to make *The Welding Engineer* a real monument to his memory.

We know that with this sincere and heartfelt assistance from his friends, his business associates, there can be but one answer. *The Welding Engineer* will go ahead and not only will it go ahead, but it will grow and expand for we all have a common interest now. That interest is to make *The Welding Engineer* prosper more than it has ever done before. In this way we are truly showing our appreciation of the services he has rendered and of our love and respect for him.

Room for All

THE trend of conversation wherever welders and executives in the welding industry meet is that there is room for all forms of autogenous welding, and that no one form of welding is supreme and sufficient in itself. This is always the impression given whether the group is strictly composed of gas welders, electric welders, or both. It is as it should be, for if there is petty jealousy within an industry, that industry does not grow, does not expand. It is not healthy. All indications show that as every year rolls by the welding industry has shown a steady growth in all directions. There have been numerous new applications of each form of welding, and each group admits that the rest are justified in their existence, and in fact, necessary for the common welfare of all.

Standardization

ECONOMY and efficiency go hand in hand. In the welding industry as in all others, standardization means both. The International Acetylene Association and other welding groups have decided, and rightly, that there should be a definite step taken towards the standardization of hose connections. At this last meeting of the I. A. A. decided steps were taken towards this end. Now that that is under way it is time to get busy in regard to standardizing the size of threads of tank connections. According to one of the leading apparatus manufacturers, this would be a highly desirable thing to accomplish. It would lead to economical production of regulators and would make it easier for the welder using the tanks. He would not have to bother with adapters of various sizes according to the make of tanks being used at the time. Thus standardization means simplification, a thing highly desired.

THE oxy-acetylene welder's hand-truck is the ambulance of the modern machine shop. Instantly accessible, quickly and easily wheeled to any part of the shop, wherever the job may be, the oxy-acetylene outfit saves thousands of dollars by eliminating delay.
The Prest-O-Lite Company has made possible the universal use of acetylene in this easily portable and economical form.
THE PREST-O-LITE COMPANY
Incorporated
General Offices: Carbide & Carbon Building
30 East 42d Street, New York
In Canada: Prest-O-Lite Co. of Canada, Ltd.
Toronto
Prest-O-Lite
DISSOLVED ACETYLENE

And Now It's Bath Tubs

Electric Arc Welding is Used in Salvaging Cast Iron Castings in Porcelain Enamel Ware Industry

By A. J. Bissell*

THE cast iron enamel ware plant is one of the most recent industries which has adopted the electric arc welding process as a new means of increasing their production. This is accomplished by reducing their ordinary losses from defective castings to a minimum. One cast iron and enamel ware plant that has always had an extremely large scrap pile has reported that it has practically eliminated this source of loss. It has done this by means of the installation of an electric arc welding set. They have also reported that this welding installation has paid for itself in the amount of savings which it made possible from salvaging defective castings in a period of one month.

Figure 1—Bath Tub Casting Before Welding. Figure 2—Casting After Welding. Figure 3—The Finished Tub—No Defects Appear

Blow hole cracks and sand pockets cause quite a heavy loss in the manufacture of the more intricate cast iron castings such as bath tubs, wash basins, sinks, etc. Any defect in the cast iron which will prevent the enamel from forming a smooth and unbroken surface after it has gone through the burning process is sufficient to cause the rejection of such a casting. In many plants of the cast iron enamel ware industry the huge scrap pile represents the loss of a rather amazingly large amount of money. In order to bring about the salvaging of these castings, it is absolutely necessary to fill the deficient spots caused by blow hole cracks and sand pockets, in such a manner that new cracks will not develop in the material added.

The material added, or used to fill these deficient spots, must be of such composition that the enamel will adhere readily after burning. Most plants in this industry have believed that the salvaging of these casting could not be accomplished.

They have thought that the cost of salvaging the castings was prohibitive. As a result, they have simply dumped the defective castings on the scrap pile. When the scrap pile reached sufficient proportion it was remelted and recast. It has been found that by using the electric arc welding process that these various and enormous defects in cast iron castings can be repaired. It has also been found that the salvaged castings may be enameled and the results which are obtained are quite equal in every way to that obtained when a perfect casting is enameled. This is done without preheating the casting. By doing away with preheating a material reduction is made in the salvaging costs. In cost of these plants, one man using a single operator arc welding set, is able to reclaim castings at a cost of 25 cents to 50 cents per casting. If these castings were scrapped it would mean a loss of from $7.00 to $15.00 per casting. Thus, one can readily see what a great saving is accomplished by welding.

In the first photograph two common defects in a bath tub casting are shown, and in photograph 2 the same tub is shown after the defects have been repaired by the electric arc welding process. The next step after filling up the defects is to grind the weld smooth prior to its being enameled. In photograph 3 one sees the finished tub after it has been enameled, and a close examination will show that there is absolutely no evidence of the defect appearing throught the enamel.—(*Note: The photographs used were obtained through the courtesy of Mr. I. E. Santure Pacific Sanitary Mfg. Co., Richmond, Calif.*)

*General Engineer, Westinghouse E. & M. Co.

FALL MEETING OF INSTITUTION OF WELDING ENGINEERS

The Institution of Welding Engineers, Ltd., of London, England, held an ordinary meeting of the Institution at the Engineers' Club in London, on Friday, October 23rd. E. A. Atkins, M. I. Mech. E., M. I. W. E., read a paper entitled "Steel Wire: Its Manufacture, Properties and Uses for Welding and Other Purposes." A discussion followed the lecture.

Dependability!

—a feature of the WD-12 Arc Welder

This welder can be depended on for strenuous and exacting service.

Standard G-E Motors are used on this equipment. They have the inherent excellence of design built into G-E Motors for over a quarter of a century. This excellence is maintained in every one of the parts of the WD-12 Arc Welding Set.

The integrity of General Electric equipment commends this welder to every user of arc welding equipment, who places *dependability* at the top of his list of requirements.

Ready to work when delivered.

The WD-12 Arc Welder

—can be furnished for any commercial voltage, phase or frequency.
—delivers 200 amperes continuously and 300 amperes for short periods.
—voltage can be adjusted to suit work.
—a two-unit machine (motor and generator).
—generator is self excited.
—reactor automatically steadies arc.
—handwheel on generator for regulating welding current.
—any value of welding current between 75 and 300 amperes.
—all commercial sizes of electrodes, large or small.
—supplies power to G-E Automatic Arc Welder for continuous welding.

There is a suitable G-E welder for your every arc welding need. Ask the nearest G-E sales office for complete information.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

43B-604

GENERAL ELECTRIC

Helping the Pipe Welder

Devices Used in Oil Refinery Greatly Reduce Labor —Clamps and Rollers—Methods of Welding Flanges to Pipe

By C. Roy Price

MORE than fifty per cent of the welding done in oil refineries is pipe welding. By virtue of continuous application of welding processes to this sort of work, considerable experimentation, and careful checking of figures and costs, there have been developed several devices and practices which have greatly standardized and facilitated the work. While the following material contains the specific experience obtained in an oil refinery, it may be found applicable and helpful in several other fields where considerable pipe welding is done.

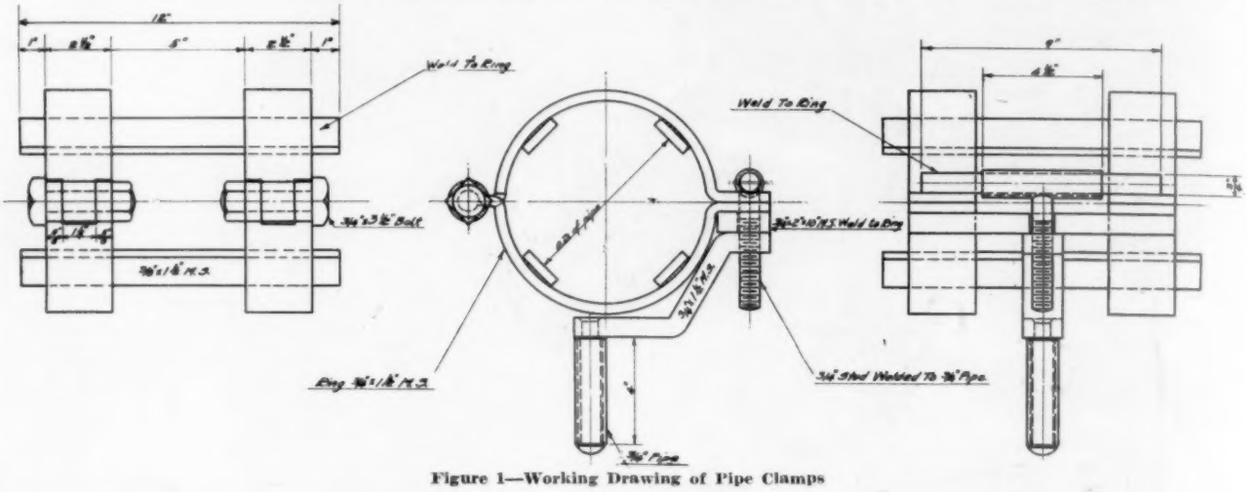


Figure 1—Working Drawing of Pipe Clamps

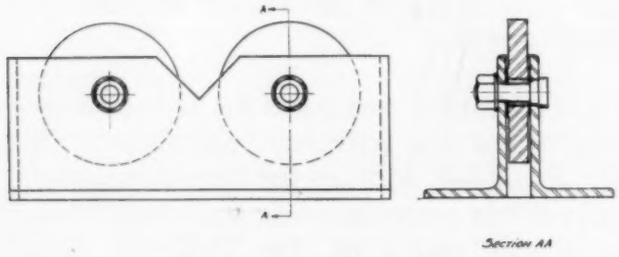


Figure 2—Construction of Roller

In the matter of straight pipe line work, it has been found that with machine beveled pipe, twice the welding speed is possible as is attained with hand beveled joints. The latter are always irregular enough to necessitate extra welding material and time for the purpose of filling up inequalities. Machine beveled pipe, if butted up with a couple of ⅛-inch welding rods, inserted for spreading, may be automatically lined up. Where the ground is uneven it has been found advisable to use a homemade clamp such as that illustrated in figures 1 and 3. This clamp is designed to hold the pipe in line until it is tacked. By means of the quick opening handle the welder is enabled to put on or take off the hot clamp in a few seconds and without the discomfort encountered in turning a nut.

When marking pipe for a square cut welders have found it a great help to wrap a rectangular piece of thin galvanized iron around it or turn it on rollers, taking care that the pipe does not move endwise while turning. If the pipe is very dirty, as it occasionally is, a template may be used, consisting of a collar bored out to fit the pipe, split lengthwise into two halves and hinged. The method of boring which causes the collar to touch the pipe only on a ⅛-inch width ring at each end makes it possible to get a square cut on dirty pipe. Of course, a square cut facilitates a straight line of pipe at the joint. It is remarkable how much a line of even 8 or 10-inch pipe will bend in both horizontal and vertical planes to follow

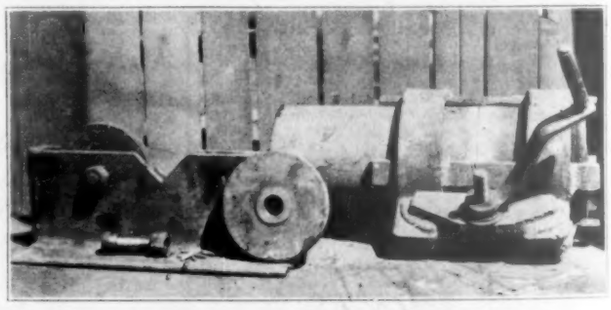
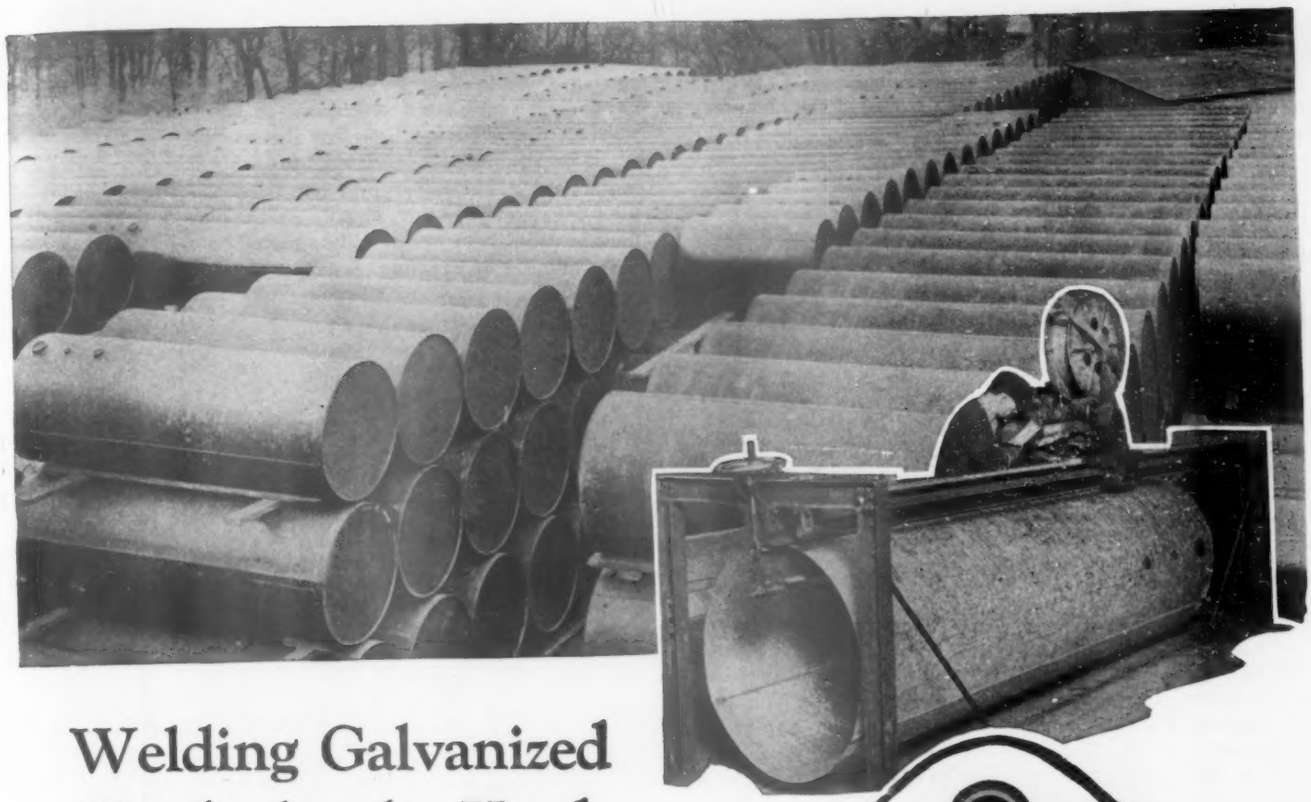


Figure 3—The Roller and Clamp

inequalities of the ground, and if care has been taken to make the welds straight, the thrust or "come-and-go" of the pipe, due to variations in temperature, will have less chance to throw continual bending strains on the welds..

The use of rollers patterned after those shown in figures 2 and 3 has been found very helpful in lining pipe in the shop. (The roller bearings of the device illustrated here are cut from $\frac{3}{16}$-inch high carbon steel welding rods.) These rollers will take all sizes from 3 inches to 12 inches, and enable the pipe to turn easily and without the jerky motion that would interfere with the continuity of welding.

Where heavy pipe must be welded in confined places, the job may be greatly facilitated by the use of horses with roller tops, (figure 4). The roller is a 4-inch pipe with a cast iron



Welding Galvanized Tanks by the Yard using G-E WELDING ELECTRODE

In this case "yard" is used in its storage sense, and means thousands of tanks.

The production of this yardful of tanks by G-E Welding Electrode and G-E Automatic welding equipment brought out these two important points:

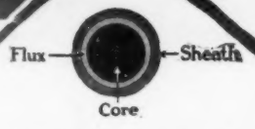
1–Rate of welding was increased five times.

2–The galvanizing adjacent to the welded seam was not destroyed—as was the case with methods used before the adoption of the G-E Welding Electrode.

The principle of enclosing core and flux in a metallic sheath gives this electrode many operating advantages among which are: arc stability—good fusion—rapid deposition—strong, ductile welds—low cost.

By the use of electric arc welding, the customer whose yard is illustrated above effected savings in two months' operation sufficient to pay for the installation of three machines.

Communicate with one of the special distributors opposite. Get full information from him.



For the first time—an electrode combining in one unit the core, flux and sheath.

Magnified cross section of G-E Welding Electrode

Special Distributors for G-E Welding Electrode

Bird-Potts Co. ..... Atlanta, Ga.
Harron, Rickard & McCone ..... 139 Townsend St., San Francisco, Cal.
Robert M. Hartwell, 353 East 2nd Street, Los Angeles, Cal.
Industrial Supply Co., Inc. 329 East 2nd St., Los Angeles, Cal.
Hendrie & Bolthoff Mfg. & Supply Co. ..... Denver, Colo.
P. F. McDonald & Co. ..17 King Terminal, Boston 27, Mass.
National Metal Products Co. ..... North side, Pittsburg, Pa.
Root, Neal & Company ..... Buffalo, New York
Joseph T. Ryerson & Son, Inc. ..... Chicago, Ill. Cincinnati, O.; Detroit, Mich.; St. Louis, Mo.
Seattle Hardware Co. ..... Seattle, Wash.
Southwest General Electric Co. ..... Dallas and Houston, Texas, Oklahoma City, Oklahoma
Strong, Carlisle & Hammond Co. ..... Cleveland, O.
R. D. Thomas & Co. ..... 521 Arch St., Phila., Pa.
Union Iron Works ..... Spokane, Washington
A. J. Wilson Co., Inc. ..... 120 Liberty St., New York
W. A. Ramsay, Ltd. ..... 74 Queen St., Honolulu, Hawaii

This booklet (Y-2019) tells all about G-E Welding Electrode. Ask nearest specicl distributor for a copy.

MERCHANDISE DEPARTMENT 48G-28

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, MERCHANDISE DEPT., BRIDGEPORT, CONNECTICUT

bushing screwed into a collar at each end. The bushings are bored to turn on a 1½-inch extra heavy pipe.

As to welded flanges three designs are illustrated here. The method shown in figure 5 was in use for some time, but has a drawback. It has been found that in preheating the flange for

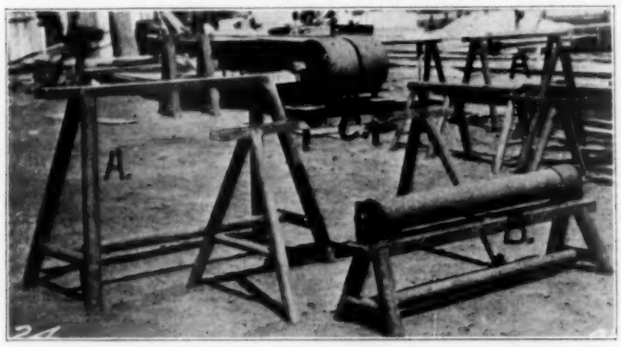


Figure 4—(A) Welded Roller; (B) Welded Horse and Roller; (C) Welded Pipe Horses With Tops of 4 Inch Channel Iron

welding "A" it is hard to get the flange molten without burning the pipe. The second method was then tried, (figure 6), but involved a lot of welding which seemed to add little to the strength of the joint. The third method tried is shown in figure 7. This was adopted. Note that in this design the weld "A" is much easier to make than it is in the other two designs, because it is on a projecting corner instead of on a wide edge.

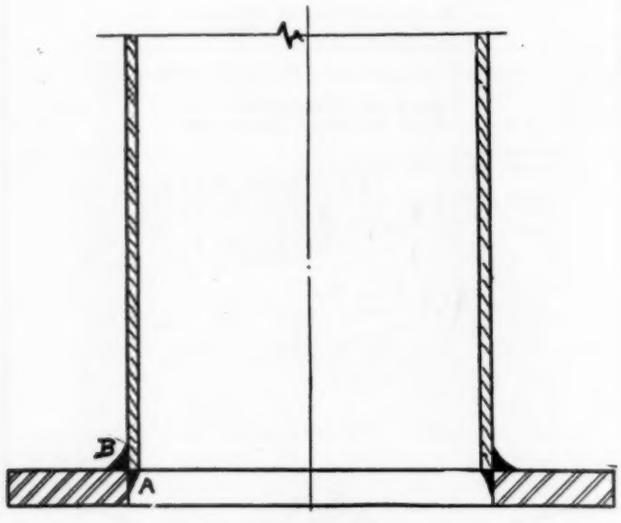


Figure 5—Method of Flanging Which Causes Burning of Pipe.

One advantage of the weld at "A" is that in preheating, it counteracts the tendency of weld "B" to warp the flange. "A" and "B" are welded at the same time, two welders being employed. This reduces cost and cuts down contraction strains.

There are various designs of flange welds which employ beveling of pipe or flange so as to form a complete weld-angle of less than 90°. The majority of these have been abandoned because a welder will either have cold shuts at the bottom of the "V" or else will be required to melt out a large amount of flange metal in order to get a solid weld.

On 4-inch pipe or smaller, on pressures not exceeding 100 lbs., the weld is made only on the pipe side of the flange. Usually flange faces of 6 inches or more are true enough to obviate the necessity of facing. If it is required, this may be done either on the lathe or pipe machine. Pipe machine jobs are by far the cheaper to set up, substituting a facing tool for a cutting-off tool. This may be done easily enough unless the pipe has flanges on each end which are too large in diameter to get through the revolving barrel of the machine. This drawback could be admirably eliminated by the means of a flange facing machine, similar in principle to the portable boring bar used in railway repair shops. With such a device, welded flanges could be automatically squared to a pipe with a minimum amount of handling.

Elbows and tees may be made with either a regular welded flange "bucked up" on short length pipe by means of the pipe

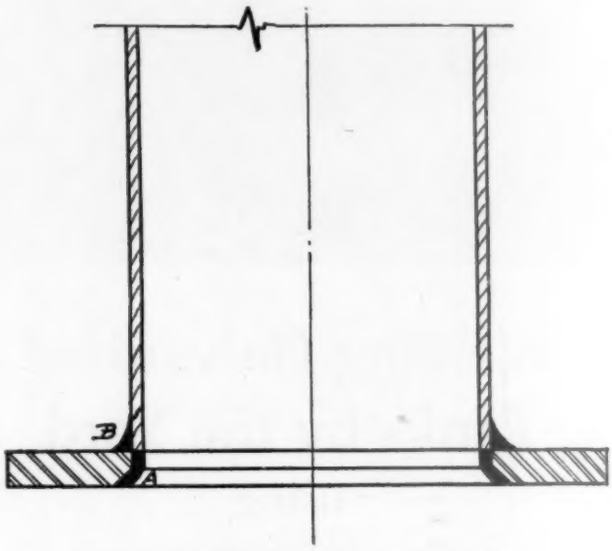


Figure 6—This Method Requires Too Much Welding

machine, or with plate flanges welded on. Elbows are made in from two to four sections. To square up the elbow flange, one of them with a first section top is bolted to the face of the standard cast iron elbow, which sets on a surface plate. The other flange and nipple also rest on the surface plate. Thus the two faces are automatically squared up. This method also

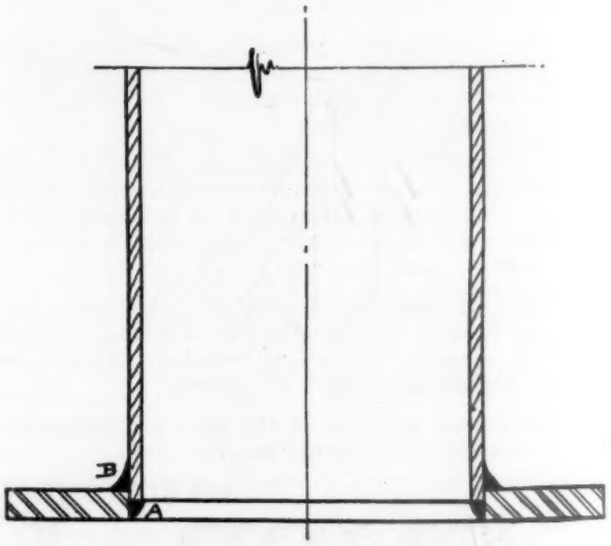


Figure 7—Method Now Used with Most Success

makes for correct height if the job is one of standard measurement fittings. To get any other special height it is necessary to block up under either casting or flange of the welded

TOBIN BRONZE

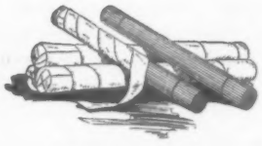
REGISTERED U.S. PAT. OFF.

Welding Rods

TOBIN Bronze Welding Rods—an exclusive Anaconda product—are universally recognized as the most satisfactory non-ferrous rods for Electric and Oxy-Acetylene welding.

Tobin Bronze flows freely at welding temperatures, making joints that are easily machined. Because of its uniform composition and high tensile strength, Tobin Bronze is unexcelled for brazing malleable and cast iron, rebuilding gears and repairing cracked cylinder heads, wheel rims, spokes, housings and all kinds of iron and steel castings.

Anaconda Welding Rods are furnished in diameters of 1/8", 3/16", 1/4", 5/16" and 3/8", in the usual three-foot lengths, special lengths and coils.



Anaconda Welding Rods For Special Purposes Include

Tobin Bronze
Manganese Bronze
Phosphor Bronze
Deoxidized Copper
Naval Brass
Muntz Metal

If you cannot obtain Anaconda Welding Rods from your regular source of supply, correspond with the nearest office listed below.

THE AMERICAN BRASS COMPANY

GENERAL OFFICES: WATERBURY, CONNECTICUT

New York, Chicago
Boston, Philadelphia, Providence
Pittsburgh, Cleveland, Detroit
Cincinnati, St. Louis, San Francisco

ANACONDA
from mine to consumer

Mills and Factories:
Ansonia, Conn., Torrington, Conn.
Waterbury, Conn., Buffalo, N. Y.
Hastings-on-Hudson, N.Y., Kenosha, Wis.

In Canada: ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

fitting. It is to be noted in Figure 8 that a piece of heavy hack saw blade is placed under the flange of the welded ell in such a way that the angle between the faces of the ell becomes slightly more than 90°. The reason for this is that even in welding under the most favorable conditions, contraction tends to draw the elbow flanges toward each other. This and statements which follow apply more to the two piece ell than to the three or four piece ell. In order to overcome this tendency it will be found advisable to weld from the inside out as shown in the diagram.

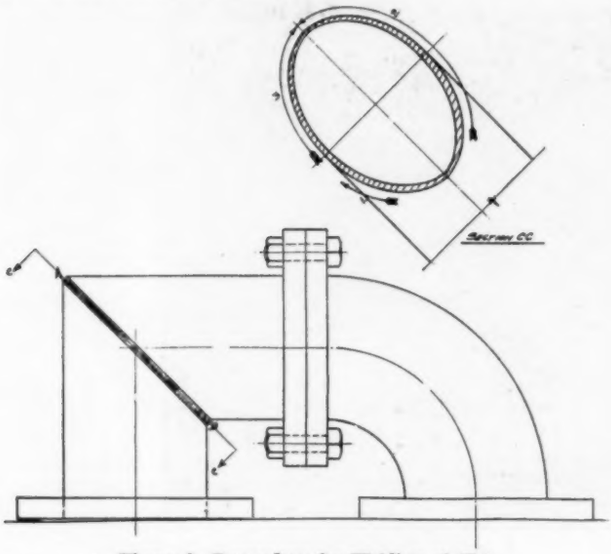


Figure 8—Procedure for Welding of "L"

If it is found that after taking these precautionary measures the elbow angle is less than 90 degrees a block wedge must be drawn between the flanges and the outside of the ell must be heated. When the heated parts cool the flanges will be found to have pulled out from the weld and the elbow angle will be greater. The reason for this is as follows: Expansion at "A," if there were no blocking at "B," would have the tendency to move the flanges toward each other like the jaws of a steel trap. Cooling and contracting "A" would cause the flanges

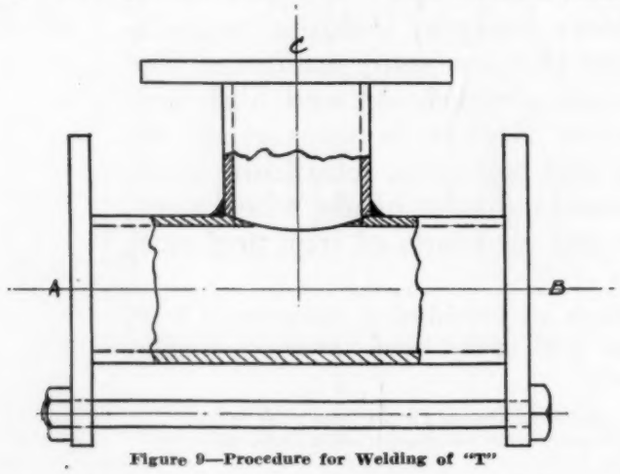


Figure 9—Procedure for Welding of "T"

to return to the first position, but the block at "B," preventing contraction there, also prevents contraction at "A" and causes the metal which is soft at high temperatures to be upset. On cooling, the contraction on the outside of the ell pulls the flanges out. This method is used in straightening up nipples on a manifold, but in this case the expansion is opposed, not by the wedges, but by the cold opposite side of the nipple. The effect is always to draw the nipple over toward the heated side.

In welding the "bull" nipple on a Tee, the contraction of the weld always tends to pull the flanges at "A" and "B" toward each other at the top. As a preventive of this the Tee is strapped down to a short piece of I beam and a shim about ⅜ inches thick is put between the I beam and the Tee. The nipple is practically broken back so that the contraction will pull it straight. A simpler method of welding the end flanges, providing they are of cast iron or cast steel, is to put two bolts from flange to flange opposite the bull nipple and draw them tight until the welding is done and cold. (Fig. 9.)

The bull plug or short nipple with the head welded in is geometrically the intersection of two cylinders of the same diameter at right angles to each other. It follows from this that the piece fitted in for the top can be cut out of a piece of scrap pipe and does not have to be bent or shaped in any way. To facilitate welding, it is a good plan to trim the middle of each side of the top pattern by an amount equal to the thickness of the metal. Then the parts of the cap next to points "A" and "C" are beveled. (Fig. 10.)

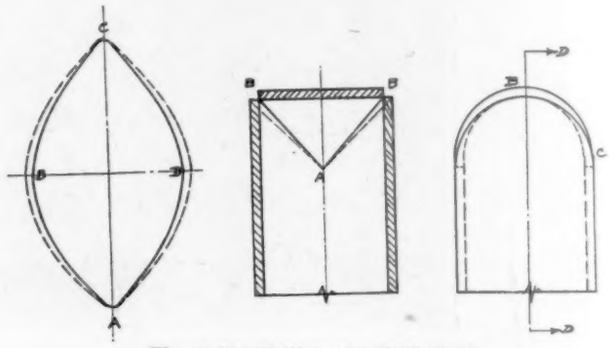


Figure 10—Welding of a Bull Nipple

In principle we have here two styles of head combined—at "B," the flat head where there is a shearing strain on the weld (not good theoretically)—at "A" and "C," like the joint between a flanged head cylinder where the weld is wholly in tension (best theoretically). The result practically is a head strong enough to do all work likely to be met around an oil refinery and probably in most other places. Any welder can make it out on the job with absolutely no other tools than the cutting and welding apparatus and the two patterns.

(To be continued)

STOODY ELECTRODE HOLDER

The Stoody Electrode Holder is a rugged one-piece tool designed to grip the rod firmly and at the same time permit rapid changing of the electrode. It has a three prong construction in which springs, levers, screws and slides have been done away with. The rod is gripped between the three prongs as shown in the illustration.

In order to insert a new electrode you place the rod between

Stoody Electrode Holder

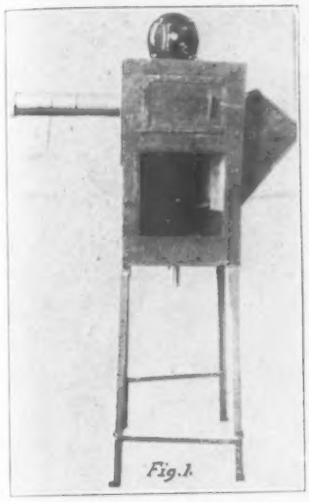
the first two prongs and bring it to a right angle position. This operation ejects the used stub at the same time. The terminal connection is at the end of the handle on the outside and in this way is accessible for new connections. The Stoody Electrode Holder will take rods from ⅛ to ⅜" and the manufacturers claim that this holder does not heat under the stress of a long job because the contact is always complete. The Stoody Electrode Holder is manufactured by the Stoody Company, of Whittier, California.

OPTICAL PROJECTION OF ARC WELDING*

By F. Davis

In the ordinary demonstration of arc welding, it is necessary to provide each spectator with an eye-shield, and the number of persons who can see the demonstration at any one time is limited to the number that can actually crowd around the man doing the welding; and, even then, most of them are so far removed from the arc that they cannot see much of what is taking place in the weld.

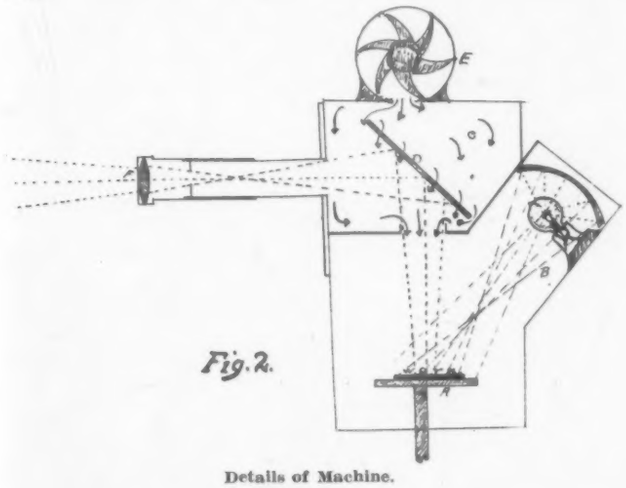
In order that they might more clearly bring out the details of arc welding, and to make it possible for a large audience to witness a demonstration, the machine described below was built. This machine is used in connection with any steropticon or moving picture screen; the only other apparatus needed being the outfit for semi-automatic welding machine or hand welding. The illumination and ventilation of the projector is supplied from single-phase 220 volt circuit.



Machine Used for Optical Projection of Arc Welding.

Fig. 1 is a photo of the projector which shows the lens tube; the ventilating motor; and one of the illuminating chambers the other one being at the opposite side from the observer.

Fig. 2 shows the machine in cross-section, in order that its action may be understood. Referring to the sketch, A is a copper plate, which serves as a table upon which the welding is done. It is connected to the positive lead from the welding generator, and is adjustable as to height, this adjustment being necessary to centralize the light from the two illuminating chambers, as the thickness of stock being welded varies.



Details of Machine.

B is one of the illuminating chambers; in this chamber there is a stereopticon lamp and a silvered glass parabolic reflector from which the light rays are focused upon the work for illumination.

C is a chamber in which is located the mirror D. E is a blower, and F a double convex lens having a 30-inch focus.

In use the machine is set up about 30 feet from a screen, and a piece of steel plate, or other material, which it is desired to weld, is placed upon the copper work plate, in which position it is in direct line with the mirror. From the mirror the image of the work is reflected through the lens and on to the screen, due to the intense illumination of the work from the two parabolic reflectors.

An arc weld, using either carbon or metallic electrode, is then made upon the plate and its perfect image, magnified many times, is shown upon the screen. Due to the intensity of the light in the arc, every detail is shown very clearly; the vapor stream, the melting of the electrode, the puddling and cooling of the metal, the forces at work in the crater, and the magnetic disturbances.

At a distance of 30 feet from the screen, the machine shows an image of the arc which is about 18 inches in diameter; quite large enough, in fact, to make a study of what takes place.

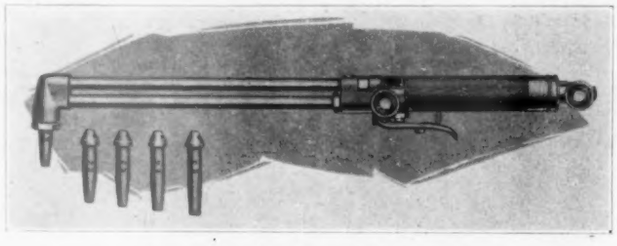
The blower at the top of the machine is there to protect the mirror and lens from smoke and dust. The blower keeps a supply of air in the chamber C, which has exit only through the bottom opening of the chamber. This downward movement of air keeps all smoke and dust out of the chamber.

*Courtesy General Electric Co.

NOVEL FEATURES IN NEW PUROX CUTTING TORCHES

The Purox Company of Denver, Colo., has recently announced a new cutting torch. Styles "E" and "F" Purox Cutting Torches are new on the market. They embody many new features which are described briefly here.

These new torches operate on oxygen, in combination with acetylene, hydrogen, or other combustible gas, and can be used for welding as well as for cutting, the transformation to welding torch being effected by means of a welding tip adapter which



New Style "E" Purox Cutting Torch.

can be supplied with either torch. This cuts off the high-pressure oxygen flow.

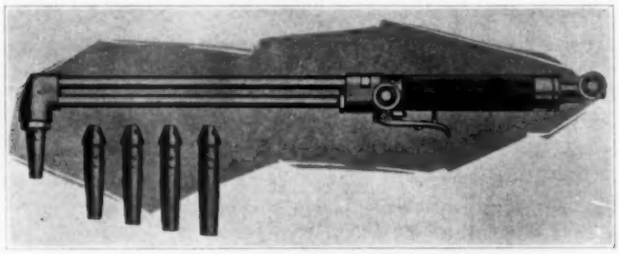
The following materials are used in their construction—Tobin-bronze drop-forged front-head; Tobin-bronze tubes, Tobin-bronze drop-forged mixing-chamber; Manganese bronze lever; and stainless steel lever-latch, pawls, screws and valve parts.

The features of the design claimed by the manufacturers are: mixer location at the front of the handle, remote from the heat at the tip, safe operation, constancy of pre-heating flame, easy manipulation, balanced torch; smooth tubes, easy guidance; removable front end tubes, permitting the use of special tubes of any required length and use of 45°, 60°, 75°, or 90° head angles according to the operator's convenience. The front end can be changed by unscrewing two nuts at the juncture of the handle and the front-end. The mixer can also be changed in the same manner, to accommodate changes from oxy-acetylene to oxy-hydrogen or other oxygen-fuel combinations. Being assembled in units it is said that repairs on these torches can be made in the field by ordinary mechanics.

The cutting-oxygen lever is placed on the lower side of the torch handle. It is operated by the first and second fingers, and is provided with a latch which locks the valve depressed to any desired extent. By touching this latch the lever is released and the high pressure flow is stopped. This high-pressure lever latch is made of a stainless steel drop-forging, hardened and

ground, and engages a hardened and ground stainless steel pawl riveted to the inside of the handle.

The oxygen and fuel tubes in the handle are silver-soldered into the forging at the front end of the handle. The handle tube is a sheath and cap, through which the oxygen and fuel connections are screwed with straight threads to the tubes in the handle. To remove the oxygen or fuel connections it is necessary to unscrew the lock. The high-pressure oxygen valve, mixing-chamber, and flame-oxygen valve are contained in one drop-forged part. The



New Style "F" Purox Cutting Torch

flame-oxygen needle valve is provided with a round knurled wheel.

Hose connections on these torches are on a horizontal plane instead of a vertical one. The head is constructed with a female thread, the tip's retaining-nut having a male thread. Tips used on Style "E" are interchangeable with those used on Styles "D" and "J." A welding tip adapter can be supplied with these torches so that the high-pressure oxygen flow is cut off and the torch can then be used for welding, with standard welding tips up to No. 8.

WELDING EXHIBIT AT INDIANA INDUSTRIAL PRODUCTS SHOW

The Indiana Oxygen Company, Indianapolis, Indiana, had a very interesting and attractive exhibit at the recent Indiana Industrial Products Show, which is restricted to the manufacturers

Novel Welding Exhibit at Indiana Show

of that state. John R. Brant was in charge of the exhibit shown here. Welding torches were used to make the smoke stacks in the background appear real and the use of electric lights gave added life and attractiveness by illuminating all of the windows in the miniature buildings. On the whole the exhibit was very unique and attractive and shows what can be accomplished along this line.

NEW BURCO SAFETY AUTOMATIC TWO GAS REGULATOR

The Burdett Mfg. Co., Chicago, has just put on the market an entirely new regulator which is known as the BURCO Two Gas Regulator. This safety automatic equal pressure two gas regulator has grown out of an idea furnished by frequent requests from the safety departments of some of the large users of oxy-acetylene apparatus. The following features are incorporated in its design:

Adjustment is made with a single adjustment wheel, which produces equal pressures in oxygen and acetylene hose lines leading from the regulator to the torch. Equal pressures are

New Burco Safety Two Gas Regulator

produced automatically and mixing of the gas in either hose length is done away with. There are no readjustments of independent regulators on oxygen and acetylene tanks.

The center gauge tells the operator the torch pressure reading for both gases, while the acetylene tank pressure gauge is to the left and the oxygen gas pressure gauge is located to the right. The design of this two gas regulator prevents the two gases mixing in the regulator.

The manufacturers state that it is impossible to use the regulator for cutting when the oxygen pressure required is not greater than 40 pounds, enabling the user to cut material 3 to 4 inches in thickness, and that there is always a sufficient volume of both gases for welding operations.

CHICAGO SECTION OF A. W. S. HOLDS INTERESTING MEETING

The Chicago Section of the American Welding Society held a very interesting meeting on the evening of November seventh. Mr. W. A. Slack of the Torchweld Equipment Co., Chicago, gave an inspiring talk on the bright future of the welding industry and briefly sited the high spots of the fall meeting of the A. W. S., in Cleveland. Mr. David Ahldin, associated with the M. Keith Dunham Co., Chicago, was to give a talk on Acetylene, but illness caused him to be absent. Following Mr. Slack's talk, Mr. E. L. Swangren, Chief of the Western Electric Welding Shop, gave an interesting discussion of the development of welding in that plant. He told about the first welding done there and then talked about the many interesting kinds of jobs turned out in his department.

Welding in the Big Plant

Introduction and Growth of Oxy-Acetylene and Electric Processes in Hawthorne Plant of Western Electric Company

By E. L. Swangren*

THE Egyptians were acquainted with the art of welding centuries ago, when Egypt was the seat of ancient civilization, and many examples of their craftsmanship have been preserved through the centuries, yet it is only recently that welding has gained its proper place in American industry. Because there were relatively few welders and even fewer good welders, industry seemed for a time to have its fingers crossed on this process, and it has taken many years to prove to the commercial world that the art was well worth developing.

When welding was first introduced at Hawthorne we faced the same problem as a merchant organizing a new and unknown business—we had to "sell" our "fellow townsmen" on the proposition. Foremen were not acquainted with the possibilities of the acetylene torch and preferred to junk broken parts or repair them in their own way rather than experiment with an untried process.

The welding department made its introductory bow in a very modest way. We secured an old fire-hose shanty that stood where the new Merchandise Building now stands and hung up our shingle. One tank of acetylene gas, one of oxygen and one blow torch was the equipment, and my job was operator, helper, gang boss and water boy.

For a time business was rather dull, but by getting acquainted with some of the foremen and pulling them out of difficulties by welding together broken machine parts, sometimes saving them weeks of delay, I soon built up enough of a clientele to warrant asking for more equipment. A successful welding job of any nature caused talk and this personal advertising brought confidence in the process to the doubtful and more work to the welding shop. The little shanty with its 65 feet of floor space did not allow much room for expansion, but some discarded sheet metal panels in the yard, welded together, supplied a neat 10 ft. by 20 ft. addition to house new equipment, and three men were added to the force, making a total of four. This pretentious expansion won an overwhelming number of new customers for the department and even a cold winter failed to freeze us out of our hose-shanty business.

The next year we were again back asking for more equipment. This time we also had to ask for floor space as the supply of discarded sheet iron panels had given out. Eight hundred square feet in the old balcony of the Foundry Building were assigned to us and we added two more equipments and two operators. From then on at regular intervals we outgrew our home until now after nine years, the business has grown from a one-man job to a department of twenty-seven men—and the end is not yet. Today we are called upon to weld almost everything from a broken safety pin to a cracked base from one of the mammoth punch presses. We have lately branched out into the electric welding game. This process being only recently introduced at the plant has not yet been given the same amount of attention as has acetylene welding.

Almost every day new uses for the welding torch are unearthed and it would take considerably more space than is available here to give a complete story on the various ways welding is saving time and labor at the Big Works, but we can find room for a few. Many good examples of the reclaiming of expensive castings could be given. A large number of various parts have been saved from the scrap heap by the welder's torch. It is hard to make many believe that we can actually weld castings, but if you could only take a little trip through Hawthorne's welding department you could see what an every-day job it is. We are now using about 100 pounds of cast-iron filler rods every month in repairing from 700 to 1,000 castings. There are many things that a welder must know before he can patch a casting. He must determine the proper allowance for expansion and contraction, proper preheating, cooling, the proper welding rods, and the proper quantity of flux if he hopes to get a thorough fusion between the metals.

After the castings leave the foundry and go to the machine shop further defects, remediable by welding, may be uncovered in the machining process, or the machinist may inadvertently remove too much metal. This also can be remedied by the man with the welding torch (in spite of the fact that the expert mechanic always warns the green lathe hand to remember that there's no such thing as a putting-on tool). Then, too, after the casting has become a part of an engine lathe, a drill press or an armouring machine, there is always the chance that some unusual strain to which the machine may be subjected or some flaw hidden in the casting may cause it to break. When that occurs the man with the welding torch again proves himself a time saver and an expense saver.

Difficult forgings, particularly those having sharp exterior angles, are built up by the welders and then finished by the blacksmiths. Often punch press dies that have become worn are rebuilt by the welders, and the welding of machine parts such as pulleys, gears, gear guards, shafts, pinions, automobile engines and frames, water tanks and coils are every-day occurrences.

Another serviceable application of the process is the welding of pipe joints, especially on large sizes used to convey air, oil, water or steam. An illustration of this use may be found in our Power House, where the threaded joint is rapidly giving place to the welded one. It is easy to weld branches to mains at any angle or furnish odd-sized reducers or special fittings. The welded joint proves much more satisfactory than the threaded one, in that once the joint is sealed it will stay tight permanently and will never leak.

Newly purchased machinery also gives the welding shop something to do, for often the machinery as purchased can better be adapted to the job it is intended for by the addition of certain attachments, or by the removal and alteration of them. For such operation there is no rival to the welding torch.

The welding department is fast putting riveting in the discard at Hawthorne. Tanks, angle-iron frames, trucks, doors, scales, window cabinets, metal furniture and structural steel shapes, which formerly required riveting, are now being put together without a single rivet. The old method of making gear guards for machinery by riveting sheet-iron to a piece of angle-iron previously shaped by the blacksmith cost approximately twice as much as the welding process. However, this type of work introduced the adaptation of electricity to welding, so we proceeded at Hawthorne along this line.

Six welding units were installed to do nothing else but turn out machine switching frames.

Spot-welding is the other form of electrical welding. It is perhaps the most important use the electric current has been put to in recent years. Some forms of spot welding machines have reached a high degree of perfection, and at Hawthorne a battery of three are effecting large savings of time in the welding of guard and top angle assemblies for machine switching frames and in the welding of angle-iron frames, sheet iron work, structural work up to five-eighths of an inch in thickness and wall assemblies used for loading coil cases.

(*Continued on Page 44*)

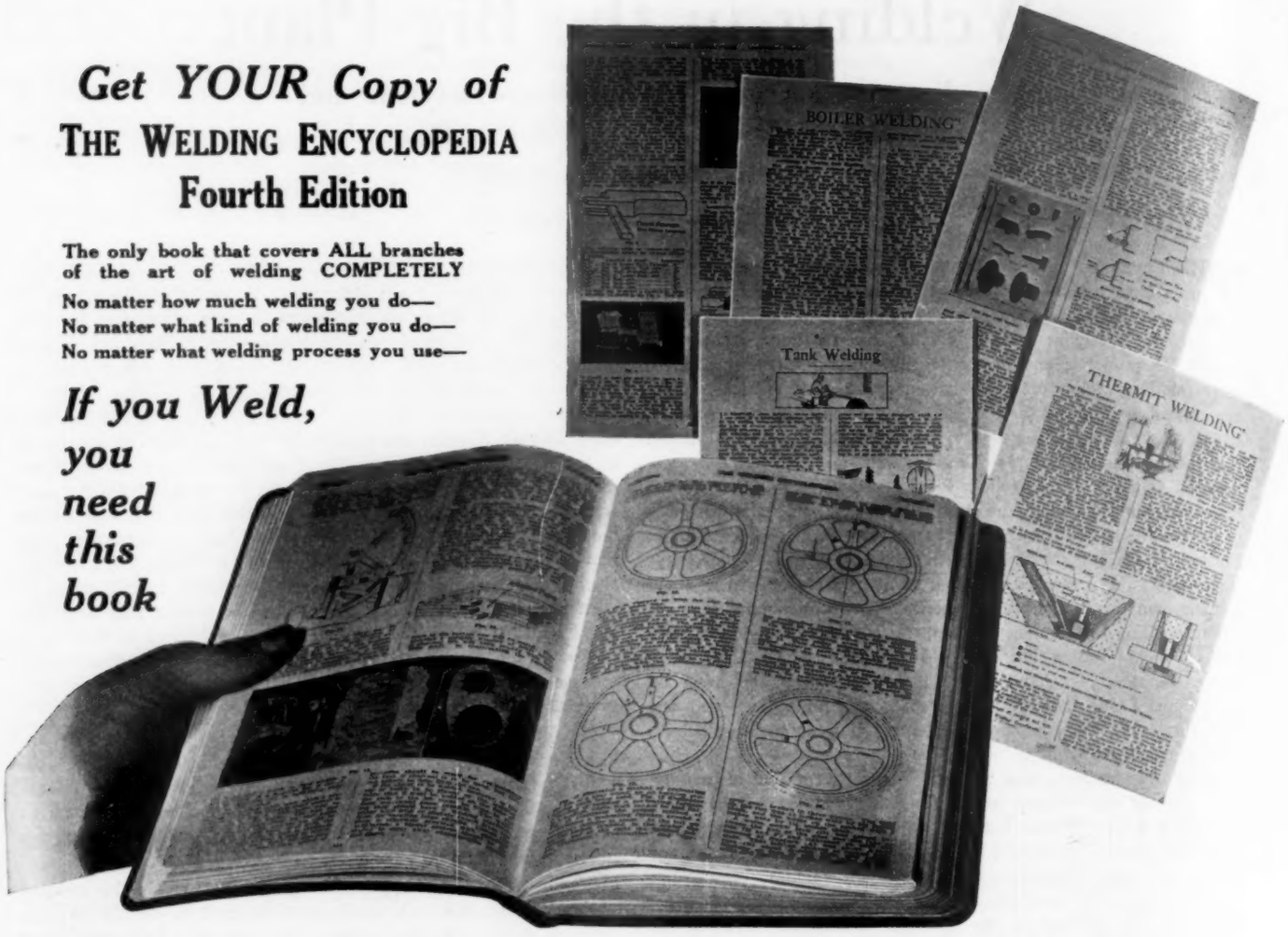
*Chief of Hawthorne Welding Shop

Get YOUR Copy of
THE WELDING ENCYCLOPEDIA
Fourth Edition

The only book that covers ALL branches of the art of welding COMPLETELY

No matter how much welding you do—
No matter what kind of welding you do—
No matter what welding process you use—

If you Weld, you need this book



THE WELDING ENCYCLOPEDIA Fourth Edition

COMPLETE—UP-TO-DATE—AUTHENTIC

Expert advice at your finger tips

It serves every possible need for information on all of the welding processes. Whether your shop is engaged in production welding or repair welding, or both, whether you use the processes for only one metal or for a variety of different metals and different types of joints, **The Welding Encyclopedia** furnishes you with expert advice which pays for itself by increasing the quality of your work. **The Welding Encyclopedia** is not restricted to the welding knowledge that can be imparted by a single writer. On the contrary, each subject is discussed by a recognized authority on that particular subject. About fifty of the best known authorities on welding subjects in the world have contributed the results of their experience and research along special lines.

In compiling **The Welding Encyclopedia** the editors have had put at their disposal a vast fund of information which could not be made available through any other source. The result is a single volume covering the entire range of problems which can arise in the application of any of the welding processes, and this information has been so carefully arranged and cross-indexed that any portion of it is instantly located.

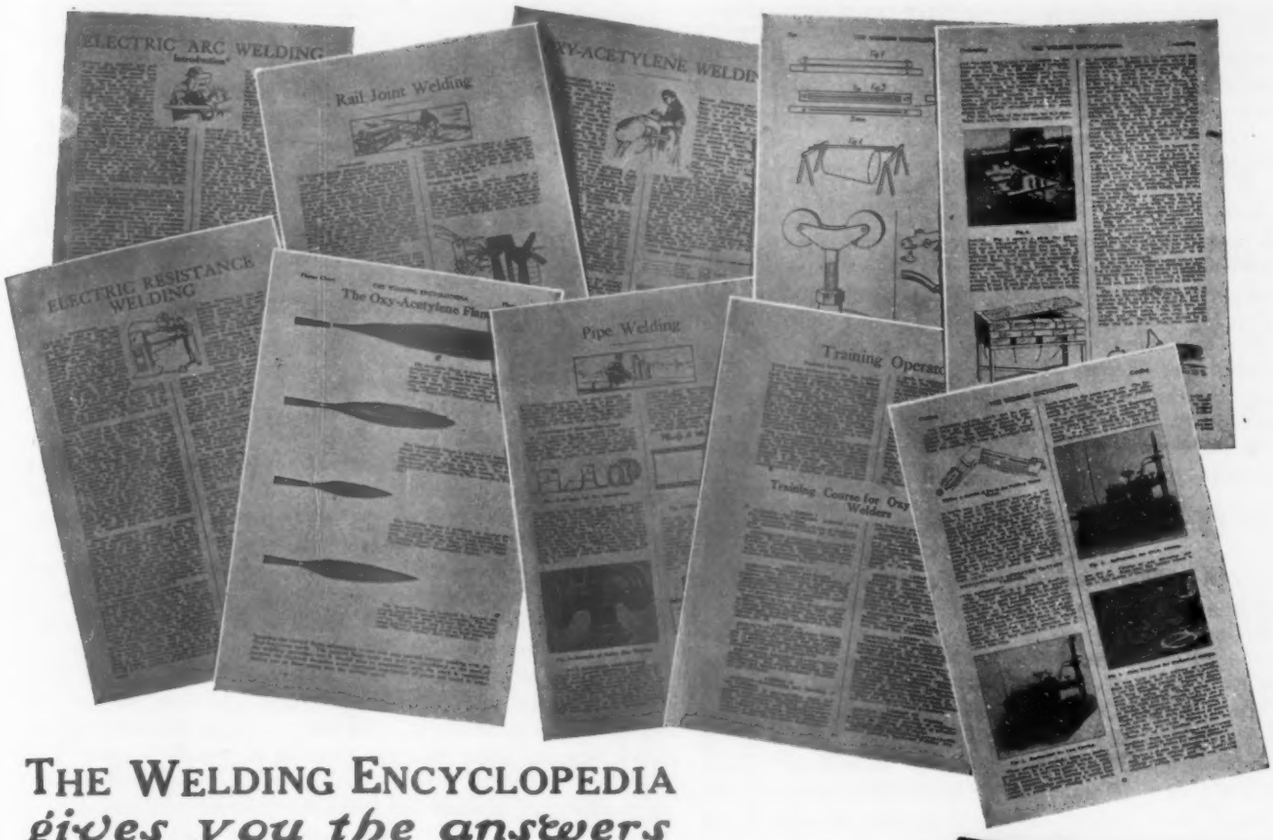
The Welding Encyclopedia describes in detail the theory and practice of every welding process, and tells how to weld every weldable metal by each of these processes, giving detailed instructions for handling such important welding jobs as boiler welding, sheet metal welding, tank welding, pipe welding, automobile welding, cutting, rail joint welding, railroad welding, etc.

It tells how to prepare parts for welding, how to preheat, how to anneal, how to test welds and how to select welding material. It explains the meaning of all words and terms found in welding literature. It gives the trade names of all products used in the welding industry, giving the name and address of the manufacturer in each case.

It tells how to take care of welding equipment so as to get the best results from it and keep maintenance costs down. It gives the latest revised federal, state and insurance rules and regulations for the installation of welding equipment, and its application to important work. There is also a splendid collection of charts and tables used for welding information, grouped together for convenient reference.

A valuable feature of The Welding Encyclopedia is the chapter on the training of operators. This chapter outlines lessons, exercises and examinations for a complete course in both oxy-acetylene and electric arc welding. Throughout these instruction courses references are supplied to the instructor and student so that they may find instantly the portions of the text which cover the topics in the outline.

The text is profusely illustrated with photographs and drawings made especially for **The Welding Encyclopedia**. No detail has been overlooked which could make The Welding Encyclopedia more complete and practical.



THE WELDING ENCYCLOPEDIA
gives you the answers

The editorial office of The Welding Engineer is recognized as the headquarters for authoritative information and help on all branches of welding, and conducts a large volume of correspondence helping welders and welding departments out of their difficulties. In a period of eight months it was found that 95% of the problems submitted to this office were answered directly from the pages of The Welding Encyclopedia.

Think of the time all these welders would have saved by providing themselves with a copy of The Welding Encyclopedia in advance! Don't wait until you get into trouble, or run up against a hard welding problem, but get the information in your hands now. Then, when you want it, it will be instantly available.

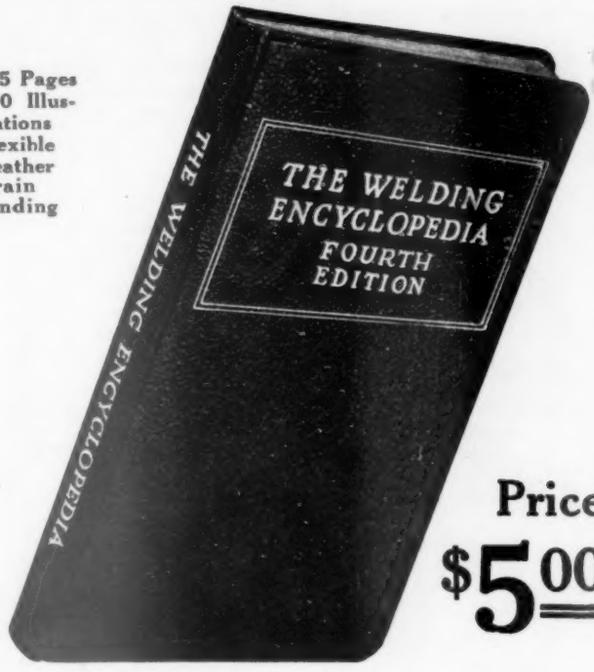
Whatever your troubles may be, you will find that The Welding Encyclopedia furnishes expert advice and instruction.

The table of contents below can give you only a very general idea of the scope of this work. Send for the book and give it a careful examination. We guarantee that it will be fully satisfactory and if not we will cheerfully make a refund. Send the coupon today.

CONTENTS

1. Illustrated encyclopedia covering all words, terms and trade names used in welding.
2. Oxy-Acetylene Welding.—Aluminum, Steel, Cast Iron, Copper, Brass, Bronze. (Full instructions for welding each of these metals.)
3. Electric Arc Welding.—Complete instructions for welding all metals, studding, cutting, etc.
4. Electric Resistance Welding.—Includes Butt Welding, Line Welding, Percussion Welding and Spot Welding.
5. Thermit Welding.—The most complete treatise on this process ever published.
6. Boiler Welding.—An important subject for the welder to study.
7. Complete chapters on Pipe Welding, Rail Joint Welding and Tank Welding, explaining procedure in detail.
8. Heat Treatment of Steels.
9. Rules and Regulations.—What can be welded and what cannot be welded. Rules also govern the installation and operation of equipment.
10. Complete instruction courses in Oxy-Acetylene and Electric Arc Welding. Lessons, Exercises, Reference Readings, Examinations.
11. Charts and Tables.—A fund of welding information at a glance. Includes color chart showing colors at various temperatures, and color chart showing proper adjustment of oxy-acetylene welding flame.
12. Condensed Catalogs.—Up-to-date information about the leading makes of welding apparatus and supplies. The Buyers' Index is a convenient and reliable guide to the man who purchases or recommends welding apparatus.

435 Pages
600 Illustrations
Flexible Leather Grain Binding



Price $5.00

Welding Engineer Publishing Co.,
608 S. Dearborn St., Chicago, Ill.

Please send me a copy of The Welding Encyclopedia, Fourth Edition, for which find enclosed five dollars. I understand that I may keep it for five days for examination and if it is not satisfactory I may return it and you will refund the purchase price.

Name .....

Street .....

Postoffice .....

WELDING IN THE BIG PLANT

(*Continued from page* 41)

Of course, the success of any work depends primarily on the men who do it, and no story of welding at Hawthorne would be complete without a tribute of our welders. Apparently no quitter ever takes up welding. Our welders, at least, never quit until their job is done. Many emergency cases arise where a welding gang will have to work very long hours to get much needed repairs in, and they always take it cheerfully. A splendid example of this recently occurred at the Works. A big power generator burned out in the Power House and emergency work was required to get it back into service. The boys were called in at 7:30 one Sunday and in spite of what a sultry summer sun had done to the temperature they worked without stopping until 12:30 o'clock that night to get the pipe lines ready, so that the generator could be put back into operation on Monday morning. They succeeded, and also were on the job the following morning at the regular time. These are the men that are responsible for the success of welding at Hawthorne.

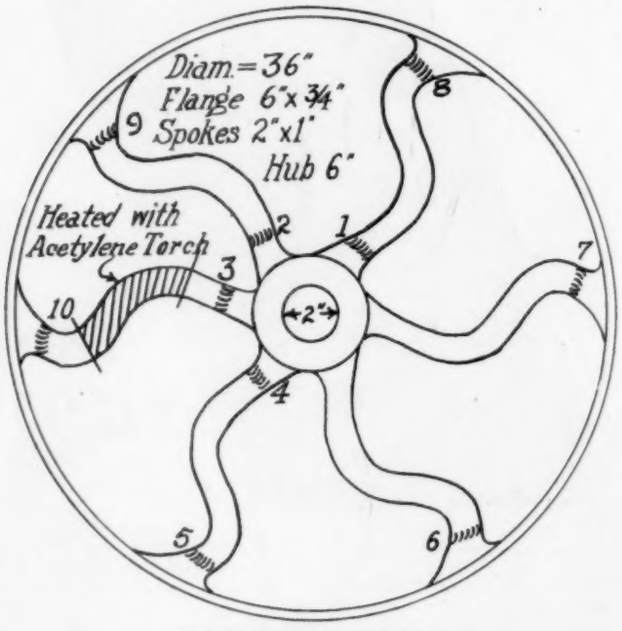
TEN WELDS IN SIX SPOKES

By A. J. DERENZO

Just recently a rather difficult welding job was brought into our shop and turned over to me. This job was on a 36" fly wheel, having a 6" hub and a 2" bore. The fly wheel was an important part of the machinery in a neighboring lumbering mill and its absence from the shop was tying up the whole place. My instructions read to weld it up as fast as an acetylene torch would do the job.

The spokes of this fly wheel were "S" shaped, as I have shown. They were 2" wide and 1" thick. The flange of the wheel was 6" wide and ¾" thick. Numbers are used in the drawing to show where all of the breaks occurred and one can see that it was no easy task to weld them and still have the fly wheel balance and run true. Six of the breaks were near the flange and four of them were near the hub.

No preheating was done as time did not allow it. The only



Ten Welds in One Fly Wheel.

aplication of heat was that required in welding and was applied with an acetylene torch between breaks three and ten. When the job was finished less than an hour was needed to machine the welds and make the wheel run true and balance perfectly.

Going more into detail regarding the actual work that was done on this fly wheel I might mention that the fly wheel was cast iron and that the filler rod that I used was a cast iron rod with a low percentage of silicon. I held the spokes in place by means of steel blocks and wedges which I have made to handle just this sort of work, for we get quite a lot of it. These special blocks and wedges do not allow the spoke to move out of alignment in any position except to allow expansion in a lengthwise direction along the spoke. Therefore when one weld is cooled the next weld to be made is in perfect position. One weld was started and finished at a time and when it had cooled sufficiently the next one was started. This relieved contraction. By noticing the sketch you will see the order in which each weld was made and the reason for making them as indicated was to get away from a large amount of contraction at the point where the last weld was made.

When I got to the last weld it was either necessary to preheat the entire rim of the fly wheel by charcoal or some other means or else to allow all of the welds to cool and thus do away with the expansion of the last weld. At this point there was an opening between the break of the fly wheel rim and the spoke. The width of the break was about ¼". It was caused by the contraction set up when the wheel cooled. That was why it was necessary to heat the spokes between breaks three and ten. The heating expanded the spoke enough to close the opening. Then it was necessary to make a fast weld and then to get back and heat the spoke again until the weld was practically cooled. In this way the contraction strain was relieved. I might add that the cost of doing this piece of work, labor and materials was only $12.50, much less of course than the price of a new fly wheel. The fly wheel has since been in continuous operation and proven successful. It is needless to say that our customer was well pleased.

NEW WESTINGHOUSE PUBLICATION

"Electrical Equipment for Railroad Shops" is the title of publication No. C-1661, which is being issued by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. It contains pertinent information and general principles, serving as a guide in the selection of electrical equipment for engine and car shops, engine terminals, freight terminals and passenger stations. The results of the application of individual motor drive and the extensive use made of magnetic control, both automatic and semi-automatic, in railway shops are described in detail and by illustrations. A description of the arc welding process and its uses in track reclamation is also given.

News of the Welding Trade

The Portland Oxygen & Hydrogen Company has changed its quarters from East 17th and Center Street, Portland, to 596 Sherlock Avenue, of that city. The new plant is to have installed a Levin liquefaction oxygen system.

The Air Reduction Sales Co., 342 Madison Avenue, New York, is reported to have leased an existing building at Lebanon, Pa., for the establishment of a branch plant for the manufacture of industrial oxygen, and kindred products. The Industrial Committee of the Lebanon Chamber of Commerce is interested in the project.

The Thomson Electric Welding Co., Lynn, Mass., has awarded contract for a one-story addition. Haven & Hopkins, 11 Beacon Street, Boston, are the architects.

The Tulsa Oxygen Co., First National Bank Bldg., Tulsa, Okla., has awarded a general contract to J. R. Brunside, 315 South Frankfort Street, for a one-story plant, 54x80 ft., at 1629 South Santa Fe Avenue.

American Welding Society
33 West 39th Street
New York, N. Y.

WHAT IS IT DOING?

WHO ARE ITS MEMBERS?

The Secretary has a copy of the Membership Directory for you. Write for it.

ACCURATE
APPLICABLE
AUTHORITATIVE !

A DEPENDABLE Reference Book pertaining to the Acetylene and Oxy-Acetylene Welding Industries—

The BRITISH ACETYLENE AND WELDING HAND BOOK

REPARED by a committee of the British Acetylene and Welding Association, this volume contains all Historical and Scientific Data relating to Acetylene, Oxygen and Carbide.

Treatises on the Application of Acetylene, Oxy-Acetylene Welding, and Oxy-Acetylene Cutting.

Tests, Specifications, Regulations, Transport Conditions, etc. The COMPLETE Reference on Acetylene and Acetylene Welding.

Bound in Cloth

Price $3.00

Distributed in the United States and Canada solely by

THE WELDING ENGINEER
608 S. Dearborn St. Chicago, Ill.

This Paper is a "Member *of the* A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers. The "A. B. P." is built upon and revolves around the following set of standards—

STANDARDS *of* PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subject to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

THE ASSOCIATED BUSINESS PAPERS, INC.
220 West 42nd St., New York

To facilitate prompt shipment on all sizes of welding rods, the Chicago Steel & Wire Company has established complete stocks at three Pacific Coast shipping points. One at 2458 East Eighth St., Los Angeles, is under the management of Mr. A. W. Courtney; one at 200 Davis St., San Francisco, is managed by Mr. W. H. Miller; while Mr. A. C. Eck is in charge of one at 914 First Ave., Seattle.

Gibb Instrument Company of Bay City, Mich., manufacturers of electric welding and electric heating equipment, announces the appointment of Mr. H. B. Beronious to represent them in Iowa, Kansas, Nebraska, Oklahoma, and Northwest Missouri. His headquarters will be 33 Linwood Terrace, Kansas City, Mo.

Erection of a new five-story and basement plant will soon be started by the General Electric Company at its Schenectady works. The new building as planned will be 150x150 feet at an estimated cost of $400,000.

The Electric Welding Supply Sales Company, 45 L Street, Boston, Mass., has recently been incorporated and will take over the business of the firm of the same name.

Linde Air Products Company, New York, N. Y., is reported to be planning the construction of an oxygen plant at Roanoke, Va.

Mr. C. C. Wheaton has recently joined the Central Steel & Wire Company of Chicago in sales promotion work. Mr. Wheaton formerly was advertising manager of the Lancaster Steel Products Corp., Lancaster, Pa.

In addition to adding a new unit to its Chicago plant the Air Reduction Sales Company has completed new plants at Birmingham, Ala., Harrisburg, Pa., and Seattle, Wash., and has doubled the capacity of the plant at Baltimore. This program of expansion, which is now well under way, will be completed when the oxygen plant at Lima, Ohio, is finished and three other plants are remodeled.

Portland Oxygen & Hydrogen Company have changed their headquarters from 596 Sherlock Avenue, Portland, Ore., to East Seventeenth and Center Streets, of that city.

The Clarke Chemical Company of Wickliffe, Ohio, is planning to install a Levin plant.

Over 200 employees of the Air Reduction Sales Company from the New York, Jersey City and Elizabethport offices attended an informal "Get-Together Dinner" at Keen's Chop House, New York, October 23rd to form a permanent athletic and social organization. The following officers were elected: C. E. Adams, Honorary President; C. S. Munson, Honorary Chairman; A. M. Fairlamb, President; E. C. Turner, L. R. McKnight, H. H. Lemmerman, Vice-Presidents; C. L. Snow, Treasurer, R. Hanson, Financial Secretary; W. Richard Witte, Recording Secretary.

The Airco Athletic Association cup, which is awarded each year to that member of the Airco Athletic Association, who, through his sportsmanship, enthusiasm, and athletic ability is adjudged to have done the most to forward the interests of the Association, was presented to Mr. A. M. Fairlamb.

Position Wanted—Oxy-acetylene welder with 5 years general experience wants permanent connection. Prefer work near Chicago. Address 41, care The Welding Engineer.

Classified Ads

Help Wanted—75c per line, minimum 4 lines.
Jobs Wanted—4 lines free.
Other Ads—$1.00 per line, minimum 4 lines.
Counted 8 words to line. Add 6 words for keyed address

Position Wanted—Oxy-acetylene welder with 8 years general experience wants permanent connection. Prefer work near Chicago. Address 42, care The Welding Engineer.

If the CLASSIFIED ADVERTISERS who ran the advertisements Nos. 35 and 36 will get in touch with the below address they will learn something to their advantage. Address No. 39 care The Welding Engineer.

Wanted—Live wires who can really sell can profitably turn their spare time into money by writing to No. 40, care The Welding Engineer.

Wanted—Two 300 lb. acetylene generators that are in first class condition. Cover all details when you write to A. E. Reymann, 2100 Auburn Avenue, Toledo, Ohio.

Position Wanted—As sales and welding engineer, electric apparatus. Nine years' experience on all makes of machines and all classes of work. Willing to go anywhere. Address J. J. Mitchell, Elks Club, Schenectady, N. Y.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of THE WELDING ENGINEER, published monthly at Chicago, Ill., Postoffice, for October 1, 1924.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared W. W. Brothers, who, having been duly sworn according to law, deposes and says that he is the business manager of THE WELDING ENGINEER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid pubication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—L. B. MacKenzie, 7131 Grandon Ave., Chicago.

Editor—L. B. MacKenzie, 7131 Grandon Ave., Chicago.

Managing Editor—

Business Manager—W. W. Brothers, Evanston, Ill.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.)

L. B. Mackenzie, 7131 Grandon Ave., Chicago.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is..... (This information is required from daily publications only.)

WELLINGTON W. BROTHERS,
Business Manager.

Sworn to and subscribed before me this 2nd day of Oct., 1924.

(Seal) JULIA C. O'BRIEN.

(My commission expires June 12, 1928.)

Wanamaker Coated Electrodes
FOR
ARC WELDING

COATED WANAMAKER ELECTRODES

Reduce your labor costs.
Reduce your current costs.
Reduce your electrode material costs.

Increase your production.
Increase the operators' efficiency.
Increase the quality of your welds.

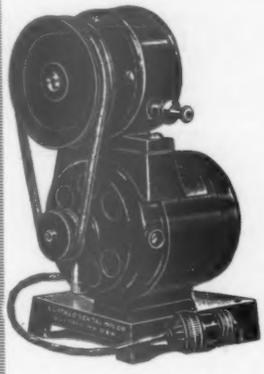
Write for details.

The new Tecor Specialties Bulletin describes the WANAMAKER COATED ELECTRODES, also a complete line of welding accessories.

Write for it today.

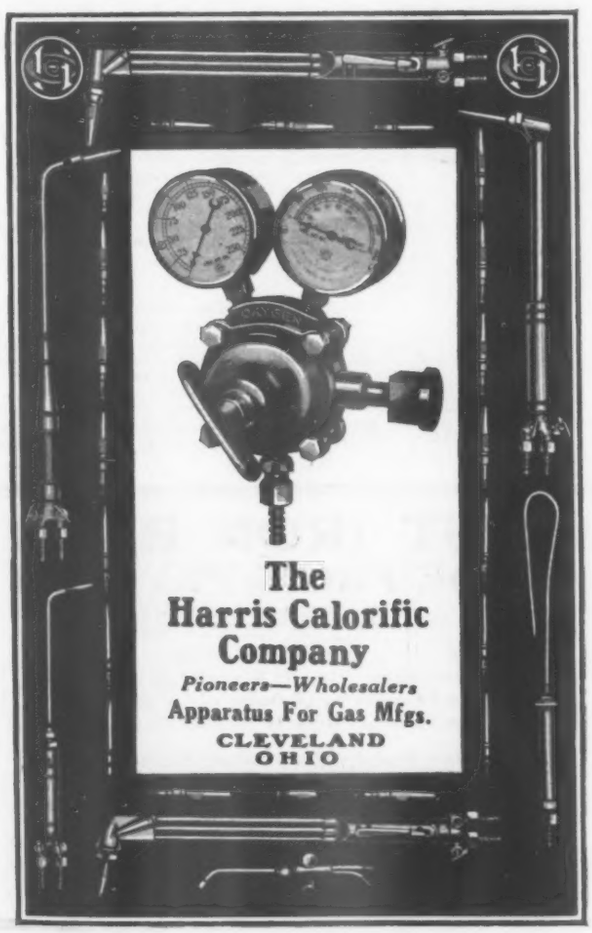
Transportation Engineering Corporation
15 PARK ROW, NEW YORK CITY.
327 SOUTH LA SALLE ST., CHICAGO, ILL.

HERE IT IS—JUST OUT



A complete Blower unit, ready to plug in to your main lamp socket, with sufficient volume of air to operate small blowpipes as used for lead burning on batteries, or for repairing radiators, etc. A rugged little blower and Electric Motor united, forming a very compact and portable outfit, weighing 8½ lbs. Price $41.00 complete as illustrated. Write for catalog "B-X," showing all our blowers and brazing outfits.

BUFFALO DENTAL MFG. CO.
Buffalo, N. Y., U. S. A.



Can You Sell?

IF you can sell—sell us on your ability to get new subscribers for the only trade paper in the United States which is devoted exclusively to all phases of autogenous welding.

Every man using the torch or arc, or any other form of welding should be a subscriber. The fact that many of them are not is because they have never been properly sold on the idea. The opportunity to cash in on this quick sale proposition in your spare time is unlimited, as you can readily see when you take into consideration the vast amount of welding being done throughout this country in all big industries. Welding is gaining importance and new industry after new industry is adopting it.

This advertisement is destined to attract the attention of the apparatus salesman who wishes to cash in profitably on his spare time. Our proposition is very liberal, for not only can you sell subscriptions to *The Welding Engineer* but you can also sell *The Welding Encyclopedia* very advantageously. The type of man we want is the industrious aggressive type who is making a large number of calls on the welding trade every day.

For more complete details write

The Welding Engineer
608 South Dearborn Street, Chicago, Ill.

TURN OUT FINISHED WORK—You will always find that your customers will pay more for a job if it is well finished. The same men will "kick" at half the price if the piece you welded is rough and has uneven layers of metal on top of the weld because the job looks sloppy. Grind every weld down—then charge your customer for a first class job.

"WODACK" COMBINATION PORTABLE ELECTRIC DRILL AND GRINDER.

Write for details about drilling and grinding the **WODACK** way.

Manufactured by Wodack Electric Tool Corporation

43 S. JEFFERSON ST. CHICAGO, ILL.

"WODACK" Combination Portable Electric Drill and Grinder Patented Nov. 1, 1921

CURRENT WELDING LITERATURE

HIGH CARBON WELDING MATERIAL, by C. A. McCune—This paper gives results of experiments over a lengthy period on low carbon welding material, in that grange structure and chemical metals welded. The percentage of each class being as follows for analysis and suitable welding material are closely related. The welding of high carbon steel represents approximately 3% of all gas, low carbon steel 60%; cast iron 19%; bronze, brass, copper, aluminum, etc., 19%; high carbon steel, including manganese steels, 1%; alloy steels, 1%. The percentage of electric is respectively: 88%—5%—1%—5% and 1%. Details are given regarding welding materials and the subject of preheating is suggested. It is not always necessary to preheat. For preheating and annealing 1,450 to 1,500 degrees F. is beneficial but not always necessary, as this depends to a great degree on the nature of the tubes of the finished weld. The results of diffrent processes are given, and while experiments on alloys or special steels have not progressed where definite conclusions could be drawn, it is reasonable to presume that if the grange structure to chemical analysis applies to commercial pure iron, low carbon and high carbon steel, definite relations should also apply in alloy steel, and even be extended to the non-ferrous group as well.—American Welding Society Journal and Railway, Purchases & Stores, November, 1924.

A BRIDGE THAT WAS REPAIRED—An account of a 400 foot bridge which had a damaged section in which damaged regions about buckled posts were covered by 3 foot sections. These sections were cut with the oxy-acetylene flame. Engineers went no further in the use of acetylene, however, securing new parts with splice, plates and rivets. Article points out advantage of welding such members over rivets.—Oxy-Acetylene Tips, November, 1924.

NON CORROSIVE AND HEAT RESISTING STEELS—A booklet published by the Crucible Steel Company of America, giving the discussion of non-corrosive steels in general, regital alloys, their mechanical properties, etc., athas alloys, non-magnetic machinery and physical properties, and details of stainless steel. This also discusses briefly the welding properties of the various metals mentioned.

WHEN NEW YORK CITY CLEANS UP—Describing the use of the cutting blow pipe in the demolition of obsolete elevated structures in New York City. Sixth Avenue spur running between 53rd and 59th Streets built 50 years ago but now obsolete and obstructing street traffic was removed by use of the oxy-acetylene cutting process. The job entailed much preliminary work in removing super structure, waiting rooms, platforms, stairways, etc. Rivets were cut by the blow pipe and the bars removed and the beams lowered by stationary steam driven crane. The job was done with a minimum amount of noise and without seriously obstructing traffic in the street.—Oxy-Acetylene Tips, November, 1924.

MAINTENANCE RATHER THAN CAPITAL ACCOUNT—Article dealing with use of the oxy-acetylene process in the reparation of old equipment, obviating the necessity of purchasing new. The possibility of economizing on capital expenditures presented in the utilizing of second hand stock in improvising first rate and workable shop equipment. Benches, standards, and frames among the articles which can be built in this manner.—Oxy-Acetylene Tips, November, 1924.

CONSIDER DEMOLITION—The use of the blow pipe in clearing away defunct and obsolete material in the shop. Article cites instance of sugar refinery wherein 20 carbonization tanks had to be removed in a short space of time.—Oxy-Acetylene Tips, November, 1924.

USES OF SPOT WELDING IN THE STRUCTURAL FIELD—by H. A. Woofter—Paper presented at Fall Meeting of The American Welding Society, Cleveland. Article deals with the entrance of spot welding in the structural field displacing riveted joints. Comparisons made of strength of spot welds versus riveted joints. Discussion of spot welding machines which have become popular since 1918 and the growth of spot welding in the building of steel structure.—Journal of American Welding Society, November, 1924.

GAS WELDING OF ALUMINUM—This article takes up in detail the various factors entering into aluminum welding, giving the flux for aluminum welding. telling how to weld without a flux, the procedure in welding character of the flame, preheating, the manipulation of the welding rod and torch, the welding of sheet aluminum and the general requirements in welding aluminum coupled with the skill required by the welder. This paper was written by Mr. S. W. Miller.—Industrial Gases, September, 1924.

AUTOGENOUS WELDING OF MONEL METAL BY OXY-ACETYLENE PROCESS—This article is taken from Machinery 7-27-24. It gives complete data on the physical properties of monel metal. preparation of the work for welding, how to execute the weld power of the blow-pipe, preheating with charcoal or other flue free from sulphur welding, monel metal welds and bars, sheet plates, castings and giving complete details of examples of monel metal welding.—Industrial Gases, September, 1924.

ORNAMENTAL IRON WORK FOR THE MOVIES—Use of oxy-acetylene cutting and welding described in the building of movie props and settings. Middle Age spectacles require wrought iron gates, window grills, candelabra, candle sticks, lamps, battle axes and numerous other works of ornamental nature. Motion picture studios are relying on welding for supplying these accessories, and several have installed central welding shops.—Oxy-Acetylene Tips, November, 1924.

OXY-ACETYLENE CUTTING AND WELDING FOR STUDENTS—Second of a series of lectures in practical welding dealing with adjusting flame, flame characteristics, handling apparatus and butt welding.—Acetylene Journal, November, 1924.

STEEL WIRE: ITS MANUFACTURE, PROPERTIES AND USES FOR WELDING AND OTHER PURPOSES, by E. A. Atkins—Content of this article contained in paper read before members of the Institution of Welding Engineers. A historic review of the manufacture of wire from ancient methods and wire drawing down to the present factory systems. A thorough discussion of modern methods, the cleaning of rods and wire and methods of wire drawing. Article goes into a scientific study of this process with microscopic views of texture of different varieties.—Welding Journal, London, October, 1924.

A STUDY OF THE OXYGEN-OIL EXPLOSION HAZARD, by Dr. M. D. Hersey of the Bureau of Mines—Information is given indicating ignition temperatures of oxygen-oil mixtures from 120° to 175° C. It is stated that an initial charging pressure of 1800 to 2000 lb. per sq. in. may lead to an explosion pressure of 20,000 lbs. per sq. in. when a few drops of mineral lubricating oil are sufficiently warmed up to explode spontaneously in a bomb of 4 cu. cm. volume. Some practical safety precautions are recommended.—Journal of the American Society of Naval Engineers, vol. 36, no. and Mechanical Engineering, October, 1924.

Dedicated

In Memory of the Originator,

President and Editor

of

The Welding Engineer—

Louis B. Mackenzie

Morey Flux & Chemical Co., Wilmington, Del. U. S. A.

CAST IRON RODS

MADE FROM PIG IRON

(NO SCRAP USED)

Approximating

3.00%—in Silicon (Result: A soft weld)
.60%—in Phosphorus (Result: Fluidity)
.02%—in Sulphur (Result: A clean weld)

Our Rods the Best by Test. Also Rods, Wires and Fluxes for Welding All Other Metals

Prices on Application

Bierman-Everett Foundry Co.,

133-153 So. 20th St., Irvington, N. J.

For Electric Welding

MANGANESE STEEL WELDING RODS

For Gas Welding

ROL-MAN MANGANESE STEEL for MAXIMUM WEAR

For TRACK WORK, MILLS, MINES, FURNACES, SMELTERS, CRUSHING, SCREENING, DREDGING & CEMENT PLANTS

A True High Manganese and High Carbon Product in Rolled Rods and Drawn Wire Presents Highest Abrasive Resistance and Maximum Wearing Qualities

Standard Sizes and Lengths Plain or Coated

MANGANESE STEEL FORGE CO. RICHMOND ST. and ERIE AVE. PHILADELPHIA, PA.

Samples on Request

If you dig into facts you will find

lives up to its slogan "More Gas per Pound"—

SHAWINIGAN PRODUCTS CORPORATION · NEW YORK · Plants · Shawinigan Falls, Quebec, · Keokuk, Iowa.

MANUFACTURERS ATTENTION!!

—OUR WHOLESALE PRICES ON PARTS ARE ATTRACTIVE—

TORCHES
NEEDLE VALVES
CONNECTIONS

REGULATORS
TANK FITTINGS
ADAPTORS

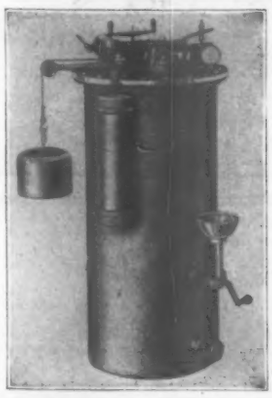
GENERATORS
MOTORS
FEEDING MECHANISM

SPECIAL PARTS BUILT TO ORDER

UNITED STATES WELDING COMPANY, Inc.

Makers of Famous "U. S." Welding & Cutting Apparatus

120-122 North First Street Minneapolis, Minn.



Superior Oxy-Acetylene Machine Company

Hamilton, Ohio, U. S. A.

REGULATORS AND GAUGES, WELDING AND CUTTING OUTFITS, ELECTRIC DRILLS AND GRINDERS

Welding and Cutting Torches that will not flash-back.
Carbon Burning and Lead Burning Outfits.
Cast Iron—Steel—Brass and Aluminum Rods, Hose, Fluxes and Goggles.

PEERLESS GENERATORS as shown are built in four sizes.

Carbide Capacity	Cu. Ft. of Gas	Price
10-lb.	50 cu. ft.	$100.00
15-lb.	75 cu. ft.	110.00
20-lb.	100 cu. ft.	130.00
25-lb.	125 cu. ft.	150.00
SUPERIOR GENERATORS		
50-lb.	250 cu. ft.	$235.00
100-lb.	500 cu. ft.	340.00
200-lb.	1000 cu. ft.	600.00

(Allowance on Acetylene tanks)

These Generators are Automatic, equipped with the CELEBRATED SUPERIOR FEED, with either WEIGHT DRIVEN—or SPRING DRIVEN MOTOR.

GENERATES GAS FOR ABOUT $1.20 PER 100 CU. FT.

CAST IRON RODS: All sizes, cast round or square, high in silicon, give a nice soft weld.

(WRITE FOR COMPLETE CATALOG.)
(Agents wanted in unoccupied territory)

WE REPAIR ALL MAKES OF TORCHES, REGULATORS AND GAUGES

Welding Carbon Products

National Round Welding Carbons
National Welding Carbon Plates
National Welding Carbon Paste
National Welding Carbon Flour

Our welding carbon products are designed especially for welding operations

National Carbon Company, Inc.
Cleveland, Ohio San Francisco, Cal.
Canadian National Carbon Co., Limited
Factory and Offices: Toronto, Ontario

CESCO COMFORT GOGGLE

No. 516
$1.00 Each
with welding lenses.
CHICAGO EYE SHIELD CO.
2300 Warren Ave., Chicago, Ill.

IMPERIAL WELDING AND CUTTING EQUIPMENT
OXY-ACETYLENE PROCESS

A new mixing principle, a regulator that accurately controls gases, the greatest working range ever covered by ONE torch—are exclusive IMPERIAL features. Write for catalog.
Imperial Brass Mfg. Co., 517 S. Racine Ave., Chicago

OXYGEN, ACETYLENE AND HYDROGEN
For Cutting, Welding, Etc.

Quick shipment and low prices on oxygen, acetylene, hydrogen, cylinders, valves, Rego welding and cutting torches, regulators, welding wire, cast iron and aluminum rods, fluxes, plain and armored rubber hose, asbestos pads and paper, goggles, etc. All equipment fully guaranteed.
We are American pioneer manufacturers of oxygen. Write for catalog and prices.

International Oxygen Company
Main Offices: NEWARK, N. J.
Branch Offices: New York, Pittsburgh, Toledo.

If you can Sell, Write
Box 37, care The Welding Engineer

DRILL—GRIND—POLISH
STRAND
FLEXIBLE SHAFT EQUIPMENTS
Several Sizes
N. A. STRAND & CO.
5001 N. Lincoln St. CHICAGO

QUASI-ARC SYSTEM

We Manufacture:
A. C. & D. C. Welding Sets
Also Weldtrodes for
Mild Steel
High Carbon
Manganese
Cast Iron
L. W. 110 V. WELDER
Gives Machinable Weld

QUASI-ARC WELDTRODE CO., INC.
Peekskill, New York

THE CUYAHOGA STEEL & WIRE COMPANY
MANUFACTURERS OF
"CUYO BRAND" WELDING WIRE
QUALITY and PRICES that are right. Let us send you samples and quote prices.
Sales Offices
676 West Grand Boulevard, Detroit, Michigan
318 First National Bank Bldg., Cincinnati, Ohio
Main Office and Mills:
BEDFORD, OHIO
(Suburb of Cleveland)

WELDING ROD HOLDERS
For the Oxy Acetylene Welder. Price $1.00
ALL STEEL WIRE BRUSHES
35c Each, 4 for $1.00
Write for Dealers' Prices
C. SORENSEN, 18 E. 16th ST., CHICAGO, ILL.

Welding Handle Troubles Eliminated

Permits of Instantaneous Electrode Change
Grips rod firmly
Does not heat
Lasts indefinitely

Price $5.00
Once used the Welder will recognize its advantages.
TRY ONE
Order through your jobber or direct from—
STOODY CO.
WHITTIER, CALIF.
Manufacturers of Stoody electrode holders and self-hardening alloy steel Electrodes.

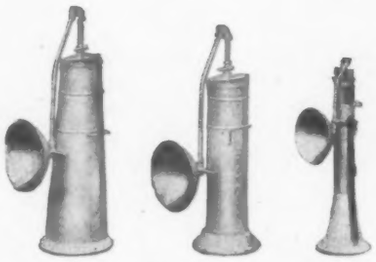
For Gases Charged at High Pressures
WM. WHARTON, JR. & CO., INC.
39 Church St., New York, N. Y.

DAVIS-BOURNONVILLE COMPANY
was merged with
AIR REDUCTION SALES COMPANY
on March 17, 1922

The Oxyacetylene Welding and Cutting products formerly manufactured by Davis-Bournonville Co. are now made and sold by Air Reduction Sales Co. under the trade name of "Airco-Davis-Bournonville" or "Airco-D-B."

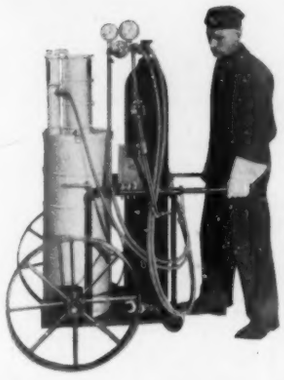
(See advertisement of Air Reduction Sales Co.)

Did You Know that Carbic Cakes Are Used for Two Distinctly Different Purposes?



Portable Lighting

For Carbic Portable Lights—those reliable long-burning units of sunshine—Carbic is serving contractors, railroads and others from Coast to Coast.



Welding and Cutting

For use in the little Portable Carbic Generators—Carbic is providing safe, low cost acetylene for welding and cutting to thousands and at every point of the compass.

Directly from our twenty-eight car load stocks located in every important section of the country and from jobbers' stocks in all important centers, Carbic is being shipped everywhere—sometimes for lighting, sometimes for welding and cutting.

Carbic is a standardized product. Thousands of tons are sold annually—all for use exclusively in Carbic equipment.

Carbic Manufacturing Company

NEW YORK
141 Centre Street

DULUTH
General Office and Factory

CHICAGO
565 W. Washington Blvd.

BOSTON
27 School Street

ATLANTA, GA.
169 Haynes Street

CHARLOTTE, N. C.
W. 9th St. & So. Ry.

KANSAS CITY, MO.
1411 St. Louis Ave.

EL PASO, TEXAS
412 Myrtle Ave.

DALLAS, TEXAS
Briggs-Weaver

DENVER, COLO.
Hendrie & Bolthoff M. & S. Co.

NEW ORLEANS, LA.
Woodward, Wight & Co.

Warehouses or representatives in all principal cities

Write us today—we've plenty interesting literature describing each use of ***Carbic.***

ELECTRIC ARC CUTTING & WELDING CO.

152 JELLIFF AVENUE, CORNER of AVON. NEWARK, N.J.

WE MAKE THE ALTERNARC WELDER — "NEWARC" ACCESSORIES AND THE

STRONG INSULATING FIBRE GRIP OFFERS COMPLETE PROTECTION AND GREATEST EASE IN HANDLING
CROSS-SECTION
NO EXPOSED METAL
AIR DUCT
SPRING OF ⅛" TEMPERED STEEL
REMOVABLE
2-POINT SUSPENSION at REAR ONLY KEEPS HEAT FROM SPRING
FIBRE GRIP
THIS BRAZED-IN COPPER LINK TRANSMITS CURRENT BUT NOT HEAT-NOTE SEPARATION OF CASTINGS
EXTRA-LONG SET-SCREWS GIVE QUICK, PERMANENT GRIP ON TERMINAL
NOTE PROTECTING MICA
QUICK-ACTING ALLIGATOR JAWS MEAN RAPID & EASY DISPOSAL OF USED ELECTRODE TIP

NEWARC

"CAMPBELL — TYPE" WELDING HANDLE

We bought the patent rights to this handle in 1918 from John J. Campbell of the Brooklyn Navy Yard and have developed it continuously for seven years.

THE HANDLE WILL NOT GET HOT AT THE HOLDING END.
THE SPRING WILL NOT LOSE ITS TEMPER OR BREAK.
THE JAWS WILL NOT BURN AWAY BY ARC USE.
PLEASE NOTE APPROVAL ORDER AT BOTTOM OF THIS PAGE.

Experience produces the best results, and we have relied upon experience to produce what we think is the most carefully developed welding handle on the market today. This development was not based on untried theory, but, instead each improvement came into being to meet requirements of hard and continued use.

Look at the pictures above. It tells you everything at a glance. See how the strongly tempered spring is placed so that it holds the heavy jaws tight with greatest lever action. Yet, a squeeze of the hand, and the jaw opens wide to drop the used electrode end. Insertion of a fresh electrode is just as rapid.

Did you notice that the jaws of the handle are entirely separate from the terminal connections, and in fact, from all that part of the handle covered by the hand. This is one of the most radical improvements ever devised in a welding handle, because it means that the heat positively cannot mount up. Moreover the casting is so ribbed that every part of the handle is ventilated, which means that its use may be continuous and convenient.

At any rate, it has been found that production has been so materially increased both by the convenience and rapidity of action that this handle pays for itself in time saved in a few days. We will accept orders on this guarantee.

Electric Arc Cutting & Welding Company, 152-156 Jelliff Ave., Newark, N. J.
Send me on approval one Campbell welding handle with (without) leads. It is understood that I am to have the privilege of return within five days, but if I decide to use the handle I will pay $10.00 if ordered with leads and $7.50 if ordered without leads.

NAME..... ADDRESS.....

CITY..... FIRM..... POSITION.....